SECTION III SPECIES PROFILES

111

MASTER SPECIES LIST

The following list contains all federally listed or proposed threatened and endangered species listed prior to July 1, 1991. To provide sufficient time for review and analysis the Service chose July 1st as the cut-off date for including species in this consultation. All species proposed for listing subsequent to that date are not considered in this opinion.

no jeopardy call were included in the chemical reference table at the beginning of each chemical opinion. Following the master species and status. This information is used in conjunction with the chemical information to provide the background for the Service's opinions. All species in this list were reviewed for possible effects to all 16 vertebrate control agents. Only those species receiving a jeopardy or list are species profiles for all species receiving a jeopardy or no jeopardy call. Species profiles contain information on species biology

| Common name (Scientific name) - Status | Region | Common name (Scientific name) - Status | Region |
|---|------------|---|------------------|
| MAMMALS | | | |
| Alabama beach mouse (Peromyscus polionotus ammobates) - E | R4 | Louisiana black bear (Ursus americanus lureolus) - T | 2 |
| Amargosa vole (Microtus californicus scirpensis) - E | RI | Lower Keys rabbit (Sybiloms natustris hefueri) - F | † S |
| Anastasia Island beach mouse (Peromyscus polionomy phayna) - F | 184 | Mariana fruit hat (Gram pon) (Domini mediani | † : |
| Black-footed ferret (Mustela nimines) T | 711 | Maintaine it uit vat (Oudin Joh.) (Fictipus mariamus) - 15 | KI |
| | K0 | Mexican long-nosed bat (Leptonycteris nivalis) - E | R2 |
| Cariobean monk seal (Monachus tropicalis) - E | R4 | Mt. Graham red squirrel (Tumiasciurus hudsonicus grahamensis) - E | R2 |
| Carolina northern flying squirrel (Glaucomys sabrinus coloratus) - ${ m E}$ | R4 | Morro Bay kangaroo rat (Dipodomys heernanni morroensis) - E | 2 |
| Choctawhatchee beach mouse (Peromyscus polionous allophrys) - E | R4 | Ocelot (Felis pardalis) - E | R2 |
| Columbian white-tailed deer (Odocoileus virginianus leucurus) - E | R | Ozark big-eared bat (Plecous townsendii ingens) - E | £2 ≅3 |
| Delmarva Peninsula fox squirrel (Sciurus niger cinereus) - E | R5 | Perdido Key beach mouse (Peromyscus polionotus trissyllensis) - E | 2 |
| Dismal Swamp southeastern shrew (Sorex longirostris fisheri) - T | RS | Point Arena mountain beaver (Aplodontia rufa nigra) - E | . ~ |
| Dugong (Dugong dugon) - E | R1 | Red wolf (Canis rufus) - E | K4 |
| Eastern cougar (Felis concolor cougar) - E | R5 | Salt marsh harvest mouse (Reithrodontomys raviveuris) - F. | . ≃ |
| Florida panther (Felis concolor coryi) - ${ m E}$ | R 4 | Sanborn's long-nosed bat (Leptonycteris sanborni) - E | K1 K2 |
| Florida salt marsh vole (Microtus pennsylvanicus dukecampbelli) - E | R4 | San Joaquin kit fox (Vulpes macrotis mutica) - E | . ≃ |
| Fresno kangaroo rat (Dipodomys nitratoides exilis) - $\mathrm E$ | R1 | Selkirk Mountain woodland caribou (Rangifer turandus caribou) - E | |
| Giant kangaroo rat (Dipodomys igens) - E | R1 | Sonoran pronghorn (Antilocapra americana sonoriensis) - E | <i>€</i> 21 |
| Gray bat (Myotis grisescens) - E | R3 | Southeastern beach mouse (Peromyscus polionous niveiveniris) - T | 7. F.Y. |
| Gray wolf (Canis lupus) - E | R6 | Southern sea otter (Enhydra lutris nereis) - T | . ₹ |
| Grizzly bear (Ursus arctos horribilis) - T | R6 | Stephen's kangaroo rat (Dipodomys stephensi) - E | . . . |
| Hawaiian hoary bat (Lasiurus cinereus semotus) - E | R1 | Tipton kangaroo rat (Dipodomys nitratoides nitratoides) -E | - X |
| Hualapai mexican vole (Microtus mevicanus hualpaiensis) - E | R2 | Utah prairie dog (Cynomys parvidens) - T | ¥6 |
| Indiana bat (Myotis sodalis) - E | R3 | Virginia big-eared bat (Plecotus townsendii vigninianus) -E | R5 |
| Jaguarundi (Felis yagouaroundi cacomitli) - E | R2 | Virginia northern flying squirrel (Glaucomys sabrinus fuscus) - E | 82 |
| Key deer (Odocoileus virginianus clavium) - E | R4 | West Indian manatee (Trichechus manatus) - E | : ₹ |
| Key Largo cotton mouse (Peromyscus gossypinus allapaticola) - E | K 4 | | |
| Key Largo woodrat (Neotonna floridana smalli) - E | R4 | BIRDS | |
| Little Mariana fruit bat (Pteropus tokudae) - $\mathrm E$ | R1 | Akiapolaau (Hemignathus munroi) - E | ж _ |

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| Common name (Scientific name) - Status | Region | Common name (Scientific name) - Status | Region |
|--|------------|--|----------------|
| Alala (Hawaiian crow) (Comus homoiioneis). E | D1 | Tints footed alaman mil /Dallin Januaramen Janinas E | 0 |
| Aboution Connects access (Demis acceptance) T | 2 2 | Light-tooled chappet tall (rains tonghouns terpins) - | 2 2 |
| Alcunali Calidua Boose (Diania canadensis leucopareia) - 1 | Y. | Marbied murrelet (<i>Brachyramphus marmoratus</i>) - 1 | Z |
| American peregrine (alcon (talco peregrinus anatum) - E | R7 | Mariana common moorhen (Gallinula chloropus guami) - E | R1 |
| Aplomado falcon (Falco peregrinus nundrius) - E | R2 | Mariana crow (Corrus hawaiiensis) - E | R1 |
| Arctic peregrine falcon (Falco peregrinus tundrius) - T | R7 | Mariana gray swiftlet (Aerodramus vanikorensis bartschi) - E | R1 |
| Attwater's greater prairie chicken (Tympanuchus cupido attwateri) - E | R 2 | Mariana mallard (Anas oustaleti) - E | R1 |
| Audubon's (Florida) crested caracara (Caracara cheriway audubonii) - T | R4 | Masked bobwhite (Colinus virginianus ridgwayi) - E | R2 |
| Bachman's warbler (Vennivora bachmanii) - E | R4 | Maui akepa (Loxops coccineus ochraceus) - E | R1 |
| Bald eagle (Haliaeetus leucocephalus) - E | R5 | Maui nukupuu (Hemignathus lucidus affinus) - E | R1 |
| Black-capped vireo (Vireo atricapillus) - E | R2 | Maui parrotbill (Pseudonestor xanthophys) - E | R |
| Bridled white-eye (Zostcrops conspicillatus conspicillatus) - E | RI | Micronesian megapode (Megapodius laperouse) - E | . R |
| California brown pelican (Pelecanus occidentalis californianus) - E | R1 | Mississippi sandhill crane (Grus canadensis pulla) - E | ·R4 |
| | . R1 | Molokai creener (Paroreomyza flamnea) - E | <u> </u> |
| California condor (Gynnogyps californianus) - E | R | Molokai thrush (Myadestes (anaiensus rutha) - E | : Z |
| California least tern (Sterna antillarum browni) - E | R1 | Nene (Hawaiian goose) (Nesochen sandvicensis) - E | : Z |
| Cape Sable seaside sparrow (Annnodramus maritimus mirabilis) - E | R4 | Newell's Townsend's shearwater (Puffing auricularis newelli) - T | <u> </u> |
| Crested honevereener (Palmeria dolei) - E | 2 | Nightingale reed warbler (Acrosentalus luscinia). F | |
| Eskimo curlew (Numenius borealis) - E | R7 | Nihoa finch (Telesma ultima). E | Z 6 |
| Florida aracelannor courrem (Anna decana namana manana | 2 2 | Niller III-ti - 4 (4 | 2 2 |
| Figure grassinglyce spart on (zininoaranas savannana) - E | 7 6 | Ninoa milieroird (Acrocephalus Jamiliarus Kingi) - E | Y |
| Figure Scrip Jay (Apriciocoma coenicscens coeniescens) - 1 | X4 | Northern aplomado Ialcon (Falco femoralis septentrionalis) - E | R2 |
| Florida shall kile (Kostrhainus sociabilis plumbeus) - E | R4 | Northern spotted owl (Strix occidentalis caurina) - T | 2 |
| Golden-cheeked warbler (Dendroica chrysoparia) - E | R2 | Oahu creepcr (Paroreomyza maculata) - E | R1 |
| Guam broadbill (Myiagra freycineti) - E | R1 | 'O'u [Hawaiian Isl. pop.] (Psititrostra psittacea) - E | R1 |
| Guam Micronesian kingfisher (Halcyon cinnamomina cinnamomina) - E | R1 | 'O'u [Kauai Isl. pop.] (Psititrostra psittacca) - E | RI |
| Guam rail (Rallus owstoni) - E | R1 | Palila (Loxioides bailleui) - E | R1 |
| Hawaii akepa (Loxops coccineus coccineus) - E | R1 | Piping plover (Charadrius melodus) - E/T | R6 |
| Hawaii creeper (Oreomystis mana) - E | R1 | Ponape greater white-eve (Rukia longirostra) - E | R1 |
| Hawaiian common moorhen (Gallinula chloropus sandvicensis) - E | RI | Ponape mountain starling (Aplonis pelzelni) - E | . R |
| Hawaiian coot (Fulica americana alai) - E | R1 | Po'ouli (Melanprosops phaeosoma) - E | 2 |
| Hawaiian dark-rumped petrel (Pierodroma phaeopygia sandwichensis) - E | RI | Puerto Rican Parrot (Amazona vittata) - E | R4 |
| Hawaiian duck (Anas wyvilliana) - E | R1 | Puerto Rican plain pigeon (Columbia inornata wennorei) - E | R4 |
| Hawaiian hawk (Buteo softarius) - E | R1 | Puerto Rico nightiar (whip-poor-will) (Caprinuleus nocitherus) - E | R4 |
| Hawaiian stilt (Hinnantopus mexicanus knudseni) - E | R1 | Red-cockaded woodpecker (Picoides borealis) - E | R 4 |
| Inyo brown towhee (Pipito fuscus eremophilus) - T | R1 | Roseate tern (Sterna dougallii dougallii) - E | R5 |
| Ivory-billed woodpecker (Campephilus principalis) - E | R4 | San Clemente loggerhead shrike (Lanius Indovicianus meams) - F | R 1 |
| Kauai akialoa (Hemignathus procerus) - E | . K1 | San Clemente sage sparrow (Amphispiza belli clementege) -T | R1 |
| Kauai nukupu (Hemignathus lucidus hanapepe) - E | R1 | Silver rice rat (Oryzomy palustris natator) - F | R4 |
| Kauai 'o'o (Moho braccatus) - E | <u> </u> | Small Kauai thrush (Myadestes palmeri) - F | R1 |
| Kirtland's warbler (Dendroica kirtlandii) - E | R3 | Tinian monarch (Old world flycatcher) (Monarcha takatsukasae) - T | |
| Large Kanai thrush (Myadestes myadestinus) - E | R. 18 | Whoming crane (Gaix americana). F | |
| Laysan duck (Anas laysanensis) - E | <u>R</u> | Wood stork (Mycteria americana) - E | 7 2 |
| Laysan finch (Telespyza cantans) - E. | . E | Yellow-shouldered blackhird (Amlaine xanthamie) - E | 2 0 |
| I east Bell's vireo (Vireo bellii misillus) . E | 120 | Vinns along and Dalles for the control of | 4 6 |
| Louis tions vites (vites ording position) - D | Zè | i unia ciapper ran (<i>ranus iongrostris yumanensis</i>) - E | \$ |
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| Common name (Scientific name) - Status |
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Region

| REPTILES | | Amber darter (Percina antesella) - E | R4 |
|--|------------|--|------------|
| Alahama red-hellied turtle (Pseudenny alahamenyis) - E | R4 | Apache trout (Oncorhynchus apache) - T | R2 |
| American alliantor (Alliantor mississimplemsis) . T(S/A) | R4 | Ash Meadows Amaragosa pupfish (Cyprinodon nevadensis mionectes) - E | 8 |
| American engated (Crossdellis acutus) - (Cir.) | R4 | Ash Meadows speckled dace (Phinichthys osculus nevadensis) - E | 2 |
| Atantic calt march enake (Nerodia fesciata taeniata) - F | R4 | Bayon darter (Etheostoma rubrum) - T | R 4 |
| Die feiled male chink (Euroce ememis Bridge) . T | R4 | Realiting shiner (Nottonis formostis) - T | R2 |
| Directained more same (cameres of this midds) at Directained formed (Cambolis eilne). | R1 | Rie Rend eamhusia (Gamhusia gaigei) - E | R2 |
| Digit-Noord technic litera (Comment situs) - E. Coorbells Vollar feinas tood frond (Hua insental) T | R1 | Rie Spring spinedace (1 enidomeda mollishinis pratensis) -T | RI |
| Complex motor condition (Masselle Committee morning) T | R2 | Rlackside dace (Phoxinus cumberlandensis) . T | R4 |
| CAURTH WATER SHAKE (PERMIT HARRY) PARCHIMETALIA) - 1 | 721 | Die china (Amrinollo contla) . T | R4 |
| Culebra Island grant anole (Anons roosevent) - E | 7 6 | Die simie (Cypintein cacinin) 1 | Re |
| Desert tortoise (Gopherus agassizii) - 1 | 2 2 | Doublian chu (Ond ecgans) - E | 2 0 |
| Eastern indigo snake (Dynnarchon corais coupert) - E | X 1 | Borax Lake chub (Gila boraxobius) - E | 2 2 |
| Flattened musk turtle (Stemotherus depressus) - T | R4 | Boulder darter (=Elk River) (Etheostoma (Nothonotus) sp.) - E | ž |
| Gopher tortoise (Gopherus polyphenus) - T | R4 | Cahaba shiner (Notropis cahabae) - E | X 1 |
| Island night lizard (Xantusia riversiana) - T | R1 | Cape Fear shiner (Notropis mekistocholas) · E | R 4 |
| Mona boa (Epicrates monensis monensis) - T | R4 | Chihuahua chub (Gila nigrescens) - T | R2 |
| Mona ground iguana (Cyclura steinegeri) - T | R4 | Clear Creek gambusia (Gambusia heterochir) - E | R2 |
| Monito gecko (Sphaerodachhis micropidhecus) - E | R4 | Clover Valley speckled dace (Rhinichthys osculus oligo) -E | R1 |
| New Mexican ridee-nosed rattlesnake (Crotalus willardi obscurus) - T | R2 | Colorado squawfish (Prychocheilus lucius) - E | R6 |
| Plymouth red-hellied turtle (Pseudennys rubriyentris banesii) - E | RS | Comanche Springs pupfish (Cyprinodon elegans) - E | R2 |
| Puerto Rican boa (Fnicrates incmants) - F | R4 | Conasauga logocrch (Percina jenkinsi) - E | R4 |
| Fucility in the last tributes in the first of the Discontinuity of the Discontinuity of the first of the firs | 27 | Cumuloga topleton (a gentle) | R |
| Kinger sawbark turne (<i>Cidpents Centical</i>) . I | 7 6 | Donne donn (Francisco rafin) T | 2 |
| Saltwater crocodile (Crocodylus porosus) - E | Z ; | Desert dace (Eremientalys acros) - 1 | 2 2 |
| Sand skink (Neoseps reynoldsi) - T | K 4 | Desert puplish (Cyprinodon macularius) - E | Z : |
| San Francisco garter snake (Thannophis sirialis tetrataenia) - E | \ <u>\</u> | Devil's Hole pupfish (Cyprinodon diabolis) - E | Z ? |
| St. Croix ground lizard (Ameiva polops) - E | R4 | Foskett speckled dace (Rhinichthys osculus spp) - T | Υ <u>.</u> |
| Virgin Islands tree boa (Epicrates monensis (=mornatus) granti) - E | R4 | Fountain darter (Etheostoma fonticola) - E | R2 |
| Yellow-blotched map turtle (Graptemys flavimaculata) - T | R4 | Gila topminnow (Poeciliopsis occidentalis) - E | R2 |
| | | Gila trout (Oncorhynchus gilae) - E | R2 |
| AMPHIBIANS | | Goldline darter (Percina aurolineata) - T | R 4 |
| Cheat Mountain salamander (Plethodon nettingi) - T | RS | Greenback cutthroat trout (Salmo clarki stomias) - T | R 6 |
| Descrit slender salamander (Batrachoseps aridus) - E | R1 | Gulf sturgeon (Acipenser oxyrhynchus desonoi) - T | R4 |
| Golden coqui (Elcutherodactylus jasperi) - T | R4 | Hiko White River springfish (Crenichthys baileyi grandis) - E | R |
| Houston toad (Bufo houstonensis) - E | R2 | Hutton tui chub (Gila bicolor ssp.) - T | RI |
| Puerto Rican crested toad (Peltophryne lemur) - T | R4 | Humpback chub (Gila cypha) - E | R6 |
| Red Hills salamander (Phaeognathus Imbrichti) - T | R4 | Independence Valley speckled dace (Rhinichthys osculus lethoporus) - E | RI |
| San Marcos salamander (Furvea nana) - T | R2 | June sucker (Chasmestes liorus) - E | R6 |
| Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum) - E | R1 | Kendall Warm Springs dace (Phinichthys osculus thermalis)-E | R6 |
| Shenandoah salamander (Plethodon shenandoah) - E | RS | Lahontan cutthroat trout (Salmo clarki henshawi) - T | R1 |
| Texas blind salamander (Typhlomolge rathbuni) - E | R2 | Leon Springs pupfish (Cyprinodon bovinus) - E | R2 |
| Wyoming toad (Bufo hemiophrys baxteri) - E | R6 | Little Colorado spinedace (Lepidomeda vittata) - T | R2 |
| | | Little Kern golden trout (Salmo aguabonita whitei) - T | R1 |
| FISH | | Loach minnow (Tiaroga cobitis) - T | R2 |
| Alabama cavetish (Speoplatyrhinus poulsoni) - E | R4 | Lost River sucker (Deliistes luxatus) - E | <u>R</u> |
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| Maryland darter (Ftheostoma sellare) - E | RS | SIIVS | |
|---|------------|--|------------|
| Money days (Meaning and | 3 2 | The state of the s | ć |
| Moapa dace (Moupa conacede) - E | X | Alamosa springsnail (<i>Liyonua alamosae</i>) - E | K2 |
| Modoc sucker (Catostomus microps) - E | R1 | Banbury Springs limpet (Lanx n. sp.) - E | R1 |
| Mohave tui chub (Gila hicolor mohavensis) - E | R1 | Bliss rapids snail (undescribed) - E | R1 |
| Neosho madtom (Noturus placidus) - T | R6 | Bruneau hot spring snail (undescribed) - E | R1 |
| Niangua darter (Etheostoma manguae) - T | R3 | Chittenango ovate amber snail (Succinea ovalis chittenangoensis) - T | RS |
| Okaloosa darter (Etheostoma okaloosae) - E | R4 | Flat-spired three toothed land snail (Triodopsis plansayoides) - T | RS |
| Owens pupfish (Cypinodon radiosus) - E | R1 | Idaho springsnail (Fontellicella idahoensis) - E | R1 |
| Owens tui chub (Gila hicolor snyderi) - E | R1 | lowa pleistocene snail (Discus macclintocki) - E | R3 |
| Ozark cavefish (Amhlyopsis rosae) - T | R3 | Magazine Mountain Shagreen (Mesodon magazinensis) - T | R4 |
| Pahranagat roundtail chub (Gila robusta jordani) - E | R1 | Noonday snail (Mesodon clarki nantahala) - T | R4 |
| Pahrump killifish (Empetrichthys latos latos) - E | R1 | Oahu (Hawaiian) tree snails (Achainella spp.) - E | R1 |
| Painte cutthroat trout (Salmo clarki seleniris) - T | R1 | Painted snake coiled forest snail (Anguispira picta) - T | R4 |
| Pallid sturgeon (Scaphirhynchus albus) - E | R6 | Snake River physa snail (Physa natricina) - E | R1 |
| Pecos bluntnose shiner (Notropus simus pecosenis) - T | R2 | Socorro springsnail (Preulopsis neomexicanus) - E | R2 |
| Pecos gambusia (Gambusia nobilis) - E | R2 | Stock Island snail (Orthalicus reses reses) - T | R4 |
| Pygmy sculpin (Couns pygnaeus) - T | R4 | Tulotoma snail (Tulotoma magnifica) - T | R4 |
| Railroad Valley springfish (Crenichthys nevadae) - T | R1 | Utah valvata snail (Valvata utahensis) - E | . K |
| Razorback sucker (Xyrauchen texanus) - E | R6 | Virginia fringed mountain snail (Polywriscus virginianus) - E | RS |
| Roanoke logperch (Percina rex) - E | RS | | } |
| San Marcos gambusia (Gambusia georgei) - E | R2 | CLAMS | |
| Scioto madrom (Nougus traumani) - E | B3 | Alahama Jamp nearly mussel (I amneilis virescens) | 70 |
| Shortnose sticker (Chavnistes breviewstris) - F | 2 2 | Appolachion manbanfasa pearly musaal (Australia angum) - E | 2 2 |
| Chalmater darter (Educationa Londona) - T | 2 2 | Apparachian monnegrace pearly mussel (Quantum sparsa) - E | Υ (|
| Stackwatci uattet (Effectionina bosenang) - 1 Clondor obuts (Taksones colon) - T | ξ 5. | Arkansas laimuckei (<i>Lainpsilis powelli</i>) - 1 | R 4 |
| School char (1) papers cann) = 1 | X 4 | Istrawing pearly mussel (Conradilla caelata) - E | K4 |
| Smoky madtom (Noturus barleyr) - E | R 4 | Cracking pearly mussel (Hemistena (=Lastena) lata) - E | R4 |
| Snail darter (Percina tanasi) - T | R4 | Cumberland bean pearly mussel (Villosa (=Micromya) trabalis) - E | R4 |
| Sonora chub (<i>Gila diacnia</i>) - T | R2 | Cumberland monkeyface pearly mussel (Quadrula internedia) - E | R4 |
| Spikedace (Meda fulgida) - T | R2 | Cumberland pigtoe mussel (Pleurobema gibberum) - E | R4 |
| Spottin chub (Hybopsis monacha) - T | R4 | Curtis' pearly mussel (Epioblasma florentina curtisi) - E | R3 |
| Unarmored threespine stickleback (Gasterosteus aculeatus williamsoni) - E | R1 | Curtus' mussel (Pleurobema curtum) - E | R4 |
| Virgin River chub (Gila robusta seminuda) - E | R6 | Dromedary pearly mussel (Dromus dromas) - E | R4 |
| Waccamaw silverside (Menidia extensa) - T | R4 | Dwarf wedge mussel (Alasmidonta heterodon) - E | RS |
| Warm Springs pupfish (Cyprinodon nevadensis pectoralis) -E | R1 | Fanshell (Cyprogenia stegaria (=irrorata)) - E | R4 |
| Warner sucker (Catostomus wamerensis) - T | R1 | Fat pocketbook pearly mussel (Potamilus capax) - E | R4 |
| Watercress darter (Etheostoma nuchale) - E | R4 | Fine-rayed pigtoe (Fusconia cuneolus) - E | R4 |
| White River spinedace (Lepidomeda albivallis) - E | R1 | Green-blossom pearly mussel (Epioblasma (=Dysnomia) torulosa subernaculum) - F | |
| White River springfish (Crenichthys baileyi baileyi) - E | R1 | Higgins' eye pearly mussel (Lampsilis higgins) - E | |
| Woundfin (Plagopterus argentissimus) - E | R6 | Inflated heelsplitter (Potamilus inflatus) - T | R4 |
| Yaqui catfish (Ictalurus pricei) - T | R2 | James River spinymussel (<i>Pleurobema collina</i>) - F. | RS |
| Yaqui chub (Gila purpurea) - E | R2 | Judge Tait's missel (Pleurobema toitianum). F | 2 2 |
| Yaqui topminnow (Pocciliopsis occidentalis sonoriensis) - E | R2 | Tittle-wing pearly mussel (Pedias fahula) - E | 7 2 |
| Yellowfin madtom (Nourus flavioimis) - T | R4 | Oniciana nearlshell (Maraaritifera hembeli) . H | 20 |
| | į | Morehall's missel (Dimohama mandall) E | 2 2 |
| | | Maishan S mussel (1 rear overna maishan) · E | 4 4 |

Region

Region Common name (Scientific name) - Status

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| Соптоя name (<i>Scientific name</i>) - Status | Region | Common name (Scientific name) - Status | Region |
|--|--------|---|------------|
| Orange-footed pearty mussel (Plethobasus cooperianus) - E | R4 | Northeastern beach tiger beetle (Cicindela dorsalis dorsalis) - T | RS |
| Pale lilliput pearly mussel (Toxolasma (=Carunculina) cylindrellus) - E | R4 | Oregon silverspot butterfly (Speveria zerene hippolyta) - T | R1 |
| Penitent mussel (Epioblasma penita) - E | R4 | Palos Verdes blue butterfly (Glaucopsyche hydamus palosverdesensis) - E | R1 |
| Pink mucket pearly mussel (Lampsilis orbiculata (=abrupta)) - E | R4 | Pawnee montane skipper (Hesperia leonardus montana) - T | R6 |
| Purple cat's paw mussel (Epioplasma (=Dysnomia) obliquata obliquata) · E | R4 | Puritan tiger beetle (Cicindela puritana) - T | RS |
| Ring pink mussel (Obovaria retusa) - E | R4 | San Bruno elfin butterfly (Callophrys mossii bayensis) - E | R1 |
| Rough pigtoe (Pleuroberna plenum) - E | R4 | Schaus swallowtail butterfly (Heraclides (Papilio) aristodemus ponceanus) - E | R4 |
| Shiny pigtoe (Finsconaia edgariana) - E | R4 | Smith's blue butterfly (Euphilotes enoptes smithi) - E | R1 |
| Speckled pocketbook (Lampsilis streckeri) - E | R4 | Tooth Cave ground beetle (Rhadine persephone) - E | R2 |
| Stirrup shell (Quadrula stapes) - E | R4 | Uncompangre fritillary butterfly (Boloria acrocnema) - E | R6 |
| Tan riffle shell (Epioblasma walkeri) - E | R4 | Valley elderberry longhorn beetle (Desmocerus californicus dimorphus) - T | R1 |
| Tar River spinymussel (Elliptio (=Canthyria) steinstansana) - E | R4 | | |
| Tubereled-blossom pearly mussel (Epioblasma torulosa torulosa) - E | R4 | ARACHINIDS | • |
| Turgid-blossom pearly mussel (Epioblasma (=Dysnomia) urgidula) - E | R4 | Bee Creek Cave harvestman (Texxella reddelli) - E | R2 |
| White cat's paw pearly mussel (Epioblasma obliquata perobliqua) - E | R3 | Tooth Cave pseudoscorpion (Microreagris texana) - E | R2 |
| White warty-back pearly mussel (Plethobasus cicatriocosus) - E | R4 | Tooth Cave spider (Leptoneta myopica) - E | R2 |
| Winged mapleleaf freshwater mussel (Quadrula fragosa) - E | R3 | | |
| Yellow-blossom pearly mussel (Epioblasma (=Dymomia) florentina florentina) - E | R4 | PLANTS | |
| | | akoko (Chamaesyce celastroides var. kaenana) - E | R1 |
| CRUSTACEANS | | akoko (Chamaesyce kuwalcana) - E | R1 |
| Alabama cave shrimp (Palaenonias alabamae) - E | R4 | Alabama canebrake pitcher-plant (Sarracenia rubra ssp. alabamensis) - E | R4 |
| California freshwater shrimp (Syncaris pacifica) - E | R1 | Alabama leather flower (Clematis socialis) - E | R4 |
| Cave crayfish (Camharus zophonastes) - E | R4 | alani (Melicope mucronulata) - E | R1 |
| Hay's Spring amphipod (Sngobromus hayi) - E | R5 | Alsinodendron trinerve (No Common Name) - E | R1 |
| Kentucky cave shrimp (Palaemonias ganteri) - E | R4 | Amargosa niterwort (Nitrophila mohavensis) - E | R1 |
| Madison Cave isopod (Antrolana lira) - T | RS | American Hart's tongue fern (Phyllitis scolopendrium var. americana) - T | R4 |
| Nashville cravfish (Orconectes shoupi) - E | R4 | Angular-fruited neraudia (Neraudia angulata) - E | R |
| Shasta cravlish (Pacifastacus fortis) - E | . R | Antioch Dunes evening-primrose (Ocnothera delloides ssp. howellii) - E | <u> </u> |
| Secorro isopod (Thermospaeroma thermophilus) - E | R2 | Arizona agave (Agave arizonica) - E | R2 |
| Squirrel Chimney cave shrimp (Palaemonetes cumming) - E | R4 | Arizona cliffrose (Purshia subintegra) - E | R2 |
| | | Arizona hedgehog cactus (Echinocereus triglochidiatus var. arizonicus) - E | R2 |
| INSECTS | | Ash Meadows blazing star (Meutzelia leucophylla) - T | R1 |
| American burving beetle (Nicrophorus americanus) - E | RS | Ash Meadows gumplant (Grindelia fravino-pratensis) - T | RI |
| Ash Meadows naucorid (Ambrysus amargosus) - T | R1 | Ash Meadows ivesia (Ivesia eremica) - T | RI |
| Bay checkerspot butterfly (Euphydrias editha bayensis) - T | RI | Ash Meadows milk-vetch (Astragalus phoenix) - T | R1 |
| Delta green ground beetle (Elaphras viridis) - T | 8 | Ash Meadows sunray (Encelionsis nudicaulis var. corrugata) - T | <u>R</u> 1 |
| El Segundo blue butterlly (Euphilotes battoides allvni) - E | RI | Ashy dogweed (Thymophylla tephroleuca) - E | R 2 |
| Kern primrose sphinx moth (Euproserpinus euterpe) · T | R1 | Aupaka (Isodendrion hosake) - E | |
| Kretschmarr Cave mold beetle (Texamaurops redelli) - E | R2 | Autumn buttercup (Ranunculus aciformis var. aestivalis) - E | R6 |
| Lange's metalmark butterfly (Apodemia mormo langei) - E | R1 | Bakersfield cactus (Opunția trealeasei) - E | R1 |
| Lotis blue butterfly (Lycaeides argrognomonilotis) - E | R1 | Baker's sticky seed (Blennosperna bakeri) - E. | <u> </u> |
| Mission blue butterfly (Icaricia icarioides missionensis) - E | R1 | Bariaco (Trichilia triacantha) - E | R4 |
| Mitchell's satyr (Neonympha mitchellii mitchellii) - E | R3 | Barneby reed-mustard (Schoenocrambe barnebyl) - E | R6 |
| Myrtle's silverspot butterfly (Speyena zerene myrtleae) - E | R1 | Barneby ridge-cress (Lepidium barnebyanum) - E | R6 |

| Common name (Scientific name) - Status | Region | Common name (Scientific name) - Status | Region |
|--|------------------|--|------------|
| Beach Iavia (<i>Layia camosa</i>) - E | <u>R</u> | Deltoid source (Furborbia (=Chanaesuse) deltoidea sen deltoidea) E | DA |
| Beautiful goetzea (matabuev) (Goetzea elegans) - E | R4 | Diamond Head echieda (Cchieda adamonici) E | 10 |
| Beautiful pawpaw (Deeringothamus pulchellus) - E | R4 | Diellia falcata (No Common Nama) - E | 2 2 |
| Black-lace hedgehog cactus (Echinocereus reichenbachii) - E | R2 | Dubautia latifolia (No Common Name) - E | 2 6 |
| Black spored quillwort (Isocues melanospora) - E | R4 | Dubantia nauciflorila (No Common Nama) E | Z 5 |
| Blowout penstemon (Penstemon haydenii) - E | R6 | Dudley Bliffs bladderrod (Legiterniella conmiecta). T | NI PA |
| Blue Ridge goldenrod (Solidago spithamaea) - T | R4 | Dwarf bear-nonny (Arctomecon humilis) - E | 9 0 |
| Bradshaw's Iomatium (Lomatium bradshawii) - E | . . 2 | Dwarf.flowered heartlest (Hexacolis manifest) T | R0 |
| Brady pincushion cactus (Pediocactus sileri) - E | R2 | Dwarf ilian (Willeria habbai) E | Α. 4 τ |
| Brooksville belfflower (Campanula robinsiae) - F | 721 | Durar Jake into (fine Journal) T | KI |
| Bunched arrowhead (Sagitaria fasciculata) - E | R4 | Dwarf ramoba (Comolo comosa) E | 2 2 |
| Bunched cory cactus (Cormhantha ramillosa) - T | 72 | Exertain manipula fairmed enabled (Distance Insection) | KI |
| Burke's goldfields (Lashenia hurkei) - F | 7V 1-0 | Edition for (Confer James 1977) - 1 | K3 |
| Butte County meadowfoam (Linnanthes floccosa sen californica). E | 2 2 | Emilia (Colomora demonstration) - E | K4 |
| California icwelllower (Caulanthus californicus) - E | Z 2 | | X 1 |
| Canhy's dronwort (Ormolis canbu) - H | 2 2 | Eulmoroid (=:Chamaesyce) garberi (No Common Name) - 1 | K4 |
| Capta the (Calleann and) E | ¥ . | Eureka Valley dunegrass (Swallenia alexandrae) - E | R.I |
| Contact was the ample of the contact | ₹ | Eureka Valley evening-primrose (Oenothera avita ssp. eurekensis) - E | RI |
| Callet 8 filostatu (<i>Prarea carteri</i>) - 15 | ₹ | Ewa Plains 'akoko (Chamaesyce skottsbergii var. kalaeloana) - E | R1 |
| Carter's panicgrass (Panicum carter) - E | Rı | Fassett's locoweed (Oxytropis campestris var. chartacea) - T | R3 |
| (assia mirabilis (No Common Name) - E | R 4 | Florida bonamia (Bonamia grandiflora) - T | R4 |
| Chamaesree halemanui (No Common Name) - E | R | Florida golden aster (Chrysopsis floridana) - E | R4 |
| Chapman rhododendron (Rhododendron chapmanii) - E | R4 | Florida torreya (Torreya tayifolia) · E | 27 |
| Chisos Mountain hedgehog cactus (Echinocereus chisoensis) - T | R2 | Florida zizinhus (Zizinhus celata) - F | F 0 |
| Clay-loving wild-buckwheat (Eriogonum pelinophilum) - E | R6 | Four-petal nawnaw (Asimina tetramera) - F | N4 |
| Clay phacelia (Phacelis argillacea) - E | 186 | Fragrant prickly-apple (Cereus eriophonis war framons) E | 100 |
| Clay reed-mustard (Schoenocrambe argillacea) - E | R6 | Fringed campion (Silene nohimerala) - E | 74 74 |
| Cobana negra (Stahlia monosperna) - T | R4 | Furbish lousewort (Dedicularis Grabishias) | 7 K |
| Cochise pincushion cactus (Corphantha robbinsorum) - T | R2 | Carrett's min (Dicerondra chilette and) - E | 2, |
| Contra Costa wallilower (Ersinun capitatun var. anatstatun) - F | . T. 2 | Cention mintroot (Chicalia continuo del E | X 4 |
| Cooke's kokio (Kokia cookei) - E. | 2 2 | Contrain print Out (Spigeta gentanotaes) - E | X 1 |
| Cook's holly (Ilex cookii) - F | | Georgipon (Georgipon minimum) - 1 | K 3 |
| Cooley's meadowrne (Thalicum cooley). F | ۲ م | Gioson's cyanea (Cyanea macrostegia var. gibsonii) - E | R.I |
| (Ooley's water-willow (Insticia cooks) - E | 7 2 | Oreen-Howered abutilon (Abutilon sandwicense) - E | R1 |
| Cronichie eigeneii (No Common Manne) - 15 | K4 | Green pitcher plant (Sarracenia oreophila) - E | R4 |
| Comments recurred (NO Commission INSIME) - 13 | K 4 | Guthrie's ground plum (Astragalis bibullatus) - E | R4 |
| Crenulate lead-plant (Amorpha crenulata) · E | R4 | Gypsum wild buckwheat (Eriogonum gypsophilum) - T | R2. |
| Cumberland rosemary (Conradina verticillata) - T | R4 | haha (Cyanea Iobata) - P | <u>R</u> 1 |
| Cumberland sandwort (Arenaria cumberlandensis) - E | R4 | haha (Cyanea mceldowneyi) - F. | P.1 |
| Cuncate hidens (Bidens cuneata) - E | R1 | haha (Cvanea pinnatifida) - E | N. |
| Cyanca superba (No Common Name) - E | R1 | Hairy rattleweed (Bantisia arachnifera) - E | 2 2 |
| Cyanea undulata (No Common Name) - E | . I.X | haliwale (Curtondra munici) - E | R4 |
| Daplinopsis hellerana (No Common Name) - E. | 13.4 13.4 | Halastala cilitarantad (Amenicaliti | Z ? |
| Davis hedgehog (Echinocereus viridiflorus var. davisii) - E | R2 | Hanlottachus hanlottachus (M. Commen Miller) - I | Z ? |
| Decurrent false aster (Boltonia decurrens) - T | 777 | Homosuchy improsuchya (NO Common Name) | KI |
| Dener's bluet (Hedwais desener). F | 2 2 | Harperella (Fullmnum nodosum (=fluvianie)) - E | RS |
| The transform amortished transform and | 2 | Harper's beauty (Harperocallis flava) - E | R4 |

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| Hawaiian centaury-plant ('awiwi) ((entauriun sebaeoides) - T | R1 | Lanai sandalwood (Santalum freycinetianum var. lanaiense) - E | R1 |
|---|----|---|----|
| Hawaiian bluegrass (Poa sandvicensis) - E | R1 | Lanai smooth phyllostegia (Phyllostegia glabra var. lanaiensis) - E | R1 |
| Hawaiian red-flowered geranium (Geraniun arboreum) - E | R1 | Lanai violet (Viola lanaiensis) - E | RI |
| Hawaiian vetch (Vicia menziesii) - E | R1 | Large-flowered fiddleneck (Amsinckia grandiflora) - E | R1 |
| Hayan lagu (serianthes) (Serianthes nelsonii) - E | R1 | Large-flowered skullcap (Scutellaria montana) - E | R4 |
| Hedyotis parvula (No Common Name) - E | R1 | Large-fruited sand verbena (Abronia macrocarpa) - E | R2 |
| Heliotrope milk-vetch (Astragalus montii) - T | R6 | Last Chance townsendia (Townsendia aprica) - T | R6 |
| Heller's blazingstar (Liatris helleri) - T | R4 | Leafy prairie clover (Dalea foliosa) - E | R4 |
| Hesperomannia lydgatei (No Common Name) - E | R1 | Leedy's roseroot (Sedum integrifolium) - T | R3 |
| Hidden-petaled abutilon (Abuilon eremiopetalum) - E | R1 | Lee pincushion cactus (Coryphantha sneedii var. leei) - T | R2 |
| Highlands scrub hypericum (Hypericum cumulicola) - E | R4 | Lepanthes eltorensis (No Common Name) - E | R4 |
| Higo chumbo (Harrisia portoricensis) - E | R4 | Liliwai (Acaena exigua) - E | R1 |
| Higuero de Sierra (Crescentia portoricensis) - E | R4 | Little Aguja pondweed (Potamogeton clystocarpus) - T | R2 |
| Hillebrand's gouania (Gouania hillebrandii) - E | R1 | Little amphianthus (Amphianthus pusillus) - T | R4 |
| Hinckley's oak (Quercus hinckleyi) - T | R2 | Lloyd hedgehog cactus (Echinocereus Iloydii) - E | R2 |
| Hoover's wooly-star (Eriastrum hooveri) · T | R1 | Lloyd's mariposa cactus (Neolloydia mariposensis) - T | R2 |
| Houghton's goldenrod (Solidago houghtonii) - T | R3 | lobed nehe (Lipochacta lobata var. laptophylla) - E | R1 |
| Howell's spineflower (Chorizanthe howellii) - E | R1 | Lobelia niihauensis (No Common Name) - E | R |
| Ilex sintenisii (No Common Name) - E | R4 | Loch Lomond covote-thistle (Ermgium constancei) - E | RI |
| Jesup's milk-vetch (Astragalus robbinsii var. jesupi) - E | RS | Longspurred mint (Dicerandra comutissima) - E | R4 |
| Johnston's frankenia (Frankenia johnstonii) - E | R2 | Lyrate bladder-pod (Lesquerella lyrata) - T | R4 |
| Jones' cycladenia (Cycladenia humilis var. jonesii) - T | R6 | Lysimachia lydgatei (No Common Name) - E | R1 |
| Kaala schiedea (Schiedea kaalae) - E | R1 | MacFarlane's four-o'-clock (Mirabilis macfarlanci) - E | R1 |
| kamakahala (<i>Labordia lydgatei</i>) - E | RI | Maguire daisy (Erigeron maguirei var. maguirei) - E | R6 |
| Kanchoa Mt. stenogyne (Stenogyne kanchoana) - E | R1 | Maguire primrose (Prinula maguirei) - T | R6 |
| Kanai han kuahiwi (<i>Hibiscadelphus distans</i>) - E | R1 | Malheur wire-lettuce (Stephanomeria malheurensis) - E | R1 |
| Kaui remya (<i>Remya kauaiensis</i>) - E | R1 | Mahoe (Alectryon macrococcus) - E | R1 |
| Ka'u silversword (Argyroxiphium kauense) - PE | R1 | Mancos milk-vetch (Astragalus humillinus) - E | R6 |
| Kearney blue star (Amsonia kearneyana) - E | R2 | Ma'oli'oli (Schiedea apokremnos) - E | R1 |
| Kern mallow (<i>Erenalche kernensis</i>) - E | R1 | Mat-forming quillwort (Isoetes tegetifornans) - E | R4 |
| Key tree cactus (Cereus robinii) - E | R4 | Maui remya (Remya mauiensis) - E | R1 |
| | R1 | Mauna Kea silversword (Argraxiphium sandwicense sandwicense) - E | R1 |
| Knieskern's beaked-rush (Rhynchospora knieskernii) - T | R5 | McDonald's rock-cress (Arabis mcdonaldiana) - E | R1 |
| Knowlton cactus (Pediocactus knowltonii) - $oxdot$ | R6 | McKittrick pennyroyal (Hedeoma apiculatum) - T | R2 |
| Koki'o (Hawaii trec cotton) (<i>Kokia drynarioides</i>) - E | R1 | Mead's milkweed (Asclepias meadii) - T | R3 |
| koʻokoʻolau (Bidens micrantha ssp. Kalealaha) - E | R1 | Menzie's waliflower (Ensimum menziesii) - E | R1 |
| Ko'oloa'ula (Abutilon) (Abutilon menziesii) - E | R1 | Mesa verde cactus (Sclerocactus mesae-verdae) - T | R6 |
| | R4 | Meyen's gouania (Gouania meyenii) - E | R1 |
| Kuenzler hedgehog cactus (Echinocereus fendleri var. kuenzleri) - T | R2 | Miccosukee (Florida) gooseberry (Ribes echinellum) - T | R4 |
| • | R1 | Michaux's sumac (Rhus michauxii) - E | R4 |
| | R4 | Michigan monkey-flower (Mimulus glabratus var. mighiganensis) - E | R3 |
| Lakeside daisy (Hymenoxys acaulis var. glabra) - T | R3 | Minnesota dwarf trout lily (Erythronium propullans) - E | R3 |
| Lanai gahnia <i>(Galnnia Ianaiensis) -</i> E | R1 | Missouri bladder-pod (Lesquerella filiformis) - E | R3 |
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Region

Common name (Scientific name) - Status

Region

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|---|------------|--|-------------|
| Monterev gilia (<i>Gilia tenuillora ssp. arenaria</i>) - 13 | <u>.</u> | Denisia dann flanna (H. | í |
| Monteomory's remus (Remus monteomory) E | 2 2 | Haille dawii liower (Hymenoxys iekana) - E | K2 |
| Mountain colden boother (II. donn) | K. | Presidio manzanila (Arctostaphylos pungens var. ravenii) - E | R1 |
| Missimilatin golden ileather (Hudsonia montana) - I | R 4 | Price's potato-bean (Apios priceana) - T | R4 |
| Mountain sweet pitcher plant (Sarracenia rubra ssp. jonesii) - E | R4 | Pygmy fringe tree (Chionanthus pygmacus) - E | R4 |
| Na ena e (Dubautia herbstobatae) - E | R1 | Relict trillium (Trillium reliquum) - E | R4 |
| Na Pali Beach bluet (Hedyotis stjohnii) - E | R1 | Remy's tetramolopium (Tetramolopium remyi) - E | R1 |
| Narrowleaved haplostachys (Haplostachys haplostachya var. angustifolia) - E | R1 | Roan Mountain bluet (Hedvotis purpurea var. montana) - E | R4 |
| Narrow-leaved stenogyne (Stenogyne angustifolia var.angustifolia) - E | RI | Robbin's cinquefoil (Potentilla robbinsiana) - F | 13. 13.5 |
| Na'u (Hawaiian gardenia) (Gardenia brighamii) - E | 8 | Rough-leaved loosestrife (I veinachia assamlasfalia) | 2 2 |
| Navajo sedge (Carex specuicola) - T | R2 | Poundlewed choff flower (Administration and Landers an | K4 |
| Navasota Ladies'-tresses (Spiranthes parkeii) - F | 27 | Dung's second chair-nower (Achiginatines spiendens var. roundata) - E | Y i |
| nehe (Linochaeta kamolensis) - E | 2 2 | Nuget's pawpaw (Deeringonamus rugein) - E | K4 |
| Noho (Linochasta nanosa) - E | 2 2 | Kunning buttalo clover (Infolium stoloniferum) - E | R3 |
| Nollo's viscontion action (Company of Company) | Ξ. | Ruth's golden aster (Pityopsis ruthii) - E | R4 |
| (veille's pincusnion cactus (<i>Corphantha minia</i>) - E | R2 | Sacramento prickly-poppy (Argemone pleiacantha ssp pinnatisecta) - E | R2 |
| Nichol's Turk's head cactus (Echinocactus horizonthalonius var. nicholii) - E | R2 | Sacramento Mountains thistle (Cirsium vinaccum) - T | R2 |
| nohoanu (Geranium multiflorum) - E | RI | Salt marsh bird's-beak (Cordylanthus maritimus maritimus) - F. | <u>8</u> |
| Northeastern bulrush (Scirpus ancistrochaetus) - E | RS | San Benito evening-primrose (Camissonia hantensis) . T | . I |
| Northern monkshood (Aconitum noveboracense) - T | R3 | San Clemente Island broom (I otus dendroideus ssp. traskias) . E | 2 6 |
| North Park phacelia (Phacelia formosula) - E | R6 | San Clemente Island bush mallow (Molocothomus clauses) | 2 2 |
| Obovate alsinidendron (Alsinidendron obovanun) - F | 12 | San Clamanta Infand indian maintain (Continue) - E | Z ? |
| oha wai (Clemontia obloucifolia sen maniensie) - F | 7 0 | See Clemente Island Indian pannorusa (Casinieja grisea) - E | ¥ |
| On the Hiera Eagles - E | 2 2 | Sail Clemente Island larkspur (<i>Delphimum kinkiense</i>) - E | R1 |
| Octorbout mill watch (Amazzalus and Land) | ¥ ; | San Diego mesa mint (Pogogme abransii) - E | RI |
| Osternout mink-vetein (Astragatus osternouth) - E | R6 | Sandplain gerardia (Agalinis acuta) · E | RS |
| l'alma de manaca (<i>Calyptronoma rivalis</i>) - T | R4 | San Francisco peaks groundsel (Senecio fransiscanus) - T | R2 |
| railhate-bracted bird s-beak (Cordylanthus palmatus) - E | R1 | Sanicula mariversa (No Common Name) - E | R1 |
| Palo colorado (Ternstroemia luquillensis) - E | R4 | San Joaquin wooly threads (Lembertia congdonii) - E | R1 |
| Palo de jazmin (Styrav portoricensis) - E | R4 | San Mateo thornmint (Acanthonnintha obovata sen duttonii). E | |
| Palo de nigua (Cornutía obovata) - E | R4 | San Rafael cactus (Pediocactus despainii). E | 1 N |
| Palo de Ramon (Banara vanderbilui) - E | R4 | Santa Ana River wooly-star (Friestrum dansifolium san sanatama) | 2 2 |
| Palo de rosa (Ottoschulzia rhodaxylon) - 1; | 8 4 | Santa Barbara Island liveformer (Dudling modified) E | Ξ. |
| Pelos del diablo (Aristida portoricensis) - E | R4 | Santa Cena america (Cumanas chambias) E | Z : |
| Pamakani (Viola chamissoniana ssp. chamissoniana) - F | 7. 12. | Sainta Citaz Opticos (Capressus uniamorana) - E | Z ; |
| Papery whitlow-wort (Paronychia charlacea) - T | 7 2 | Schoung annual On Common Name) - E | . |
| Pedate checker mallow (Sidalcea nedata) - F | 10 | Schooling are taking (100 Columnia) - 1 | K4 |
| Pechles Navaio cactus (Pediocactus neeblesiams was neeblesiams). | Z ć | Schwelling S Summower (Hellanning Schweinitzii) - E | R4 |
| 9 | 7.7 2.7 | octud diazing star (<i>Liatris ohlingerae</i>) - E | R4 |
| Darento at tellinos (Tallinos (Tallinos) - 1 | K 6 | Scrub lupine (Lupinus aridorum) - E | R4 |
| reassementation (Trumm) persistens) - E | R4 | Scrub mint (Dicerandra frutescens) - E | R4 |
| Peters Mountain mallow (<i>Iliannia corei</i>) - T | RS | Scrub plum (Prunus geniculata) - E | R4 |
| Phyllosicgia mollis (No Common Name) - E | R1 | Scutellaria floridana (No Common Name) - T |) A |
| Pitcher's (dune) thistle (Cirsium pitcheri) - T | R3 | Sebastonol meadowfoam (Tinnanthe vinculans) - E | Ž : |
| Poa siphonoglossa (No Common Name) - E | . R | Senty milk votch (Astronolis crammonbulos nos oscinicales) E | K. |
| Point Reyes clover lupine (Lupinus tidestromii var. Iayneae) - E | Z | Shale harren rock-crees (400bis saraina) E | K2 |
| Pondberry (Lindera melissifolia) - E | E 24 | Short's anidomned (Colidon secontal) - E | 2 7 |
| Prairie bush-clover (Lespedeza leptostachya) . T | 2 6 | Silver alternation (Solidago storiii) - E | R4 |
| | 3 | oner pincusinon cacius (<i>regiocacius sileti</i>) - E | R6 |

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|---|----------|--|------------|
| Silene nerbnanii (No Common Name) . F | B1 | wawae'iole (Hunerzia mannii) - F | RI |
| Clauder horned enineffection (Dodeschema language) H | 10 | Welsh's milkness (declaring welshii) . T | R6 |
| Siender-normed spinendwer (Liouecanema reprocessa) - E | 2 2 | WCISH S HINKWEEL (ASCIETING WEISHIL) - A | א ני |
| Slender-leaved nehe (<i>Lipochaeta tenuifolia</i>) - E | ¥ | Western prairie tringed orchid (Platanthera praeciara) - 1 | 2 7 |
| Slender-petaled mustard (Thelypodium stenopetalum) - E | ₹ | Wheeler's peperomia (Peperomia wheeleri) - E | K4 |
| Slender rush-pea (Hoffmanseggia tenella) - E | R2 | White birds-in-a-nest (Mcbridea alba) - T | R4 |
| Small-anthered bittercress (Cardamine micranthera) - E | R4 | White-haired goldenrod (Solidago albopilosa) - T | R4 |
| Small's milkpea (Galactia smallii) - E | R4 | White irisette (Sisyrinchim dichotomum) - E | R4 |
| Small whorled novonia (Isotria medeoloides) - E | RS | Wide-leaf warea (Warca annewifolia) - E | R4 |
| Sunt more postuli (nomin cunifolium) - E | R4 | Wireweed (Polysonella basizania) . F | R 4 |
| Sudverved (12) rigidin cancifornant = 1.5 | ÷ 6 | Williamood (1 Oilgoneilla labina) - D | 70 |
| Sneed pincushion cactus (Corphantha sneedii var. sneedii) - E | ¥2 | Wright lishhook cactus (Scierocactus Wrightiae) - 1 | \$ E |
| Solano grass (Tuctoria mucronata) - E | 8. | Xylosma crenatum (No Common Name) - E | K1 |
| Sonoma spineflower (Chorizanthe valida) - E | R1 | Zapat's bladderpod (Lesquerella pallida) - E | R2 |
| Spineless hedgehog cactus (Echinocereus triglochidiatus var. inermis) - E | R6 | Zuni fleabane (Erigeron rhizomatus) - T | R2 |
| Spreading avens (Geum radiatum) - E | R4 | | |
| Spring-loving centaury (Centaurium namophilum) - T | RI | | |
| Steamboat Springs buckwheat (Eriogonum ovalifolium var. williamsiae) - E | R1 | | |
| Stenowne campanulata (No Common Name) - E | ≅ | | |
| St. Thomas prickly ash (Zanthawlum thomasianum) - E | R4 | | |
| Swamp with (Helonias hullata) - T | 50 | | |
| awamp print (reconds parada) - 1 | 2 3 | | |
| concessee yellow-eyed grass (Xyms tennesseensis) - E | K4 | | |
| Tennessese purple coneflower (Echinacea tennesseansis) - E | R4 | | |
| Terlingua Creek cat's-eye (Cryptantha crassipes) - T | R2 | | |
| Tenstroemia subsessilis (No Common Name) - E | R4 | | |
| Tetramolopium lepidotum var. lepidotum (No Common Name) - E | R1 | | |
| Texas poppy-mallow (Callirhoe scabriuscula) - E | R2 | | |
| Texas snowbell (Styrax texana) - E | R2 | | |
| Texas trailing phlox (Phlox nivalis var. texensis) - T | R2 | | |
| Texas wildrice (Zizania texana) - E | R2 | | |
| Thread-leaved tetramolopium (Tetramolopium filiforme) - E | 181 | | |
| Tiny polygala (<i>Polygala smallii</i>) - E | R4 | | |
| Toad-flax cress (Glaucocarpum suffruescens) - E | R6 | | |
| Tobusch's fishhook cactus (Ancistrocactus tobuschii) - E | R2 | | |
| Todsen pennyroyal (Hedeoma todsenii) - E | R2 | | |
| Truckee harberry (Mahonia sonnei) - E | R1 | | |
| Tumamoc globeberry (Tumamoca macdougalii) - E | R2 | | |
| Uhiuhi (mezoneuron) (Caesalpinia kavaiense) - E | R1 | | |
| Τ. | R6 | | |
| Ute ladies'-tresses (Spiranthes diluvialis) - T | R6 | | |
| Vahl's boxwood (Buxus vahlii) - E | R4 | | |
| villous water-fern (ihi ihi) (Marsilea villosa) - E | 2 | | |
| Viola helenae (No Common Name) - E | | | |
| Virginia round-leaf birch (Betula uber) - E | RS | | |
| Virginia spiraea (Spiraea virginiana) - T | RS | | |
| Walker's manioc (Manihot walkerae) - E | R2 | | |
| | ! | | |

Region

Common name (Scientific name) - Status

Region

MAMMALS

ALABAMA BEACH MOUSE (Peromyscus polionotus ammobates) - E

SPECIES INFORMATION: A subspecies of the oldfield mouse (*Peromyscus polionotus*), the Alabama beach mouse has a small body, haired tail, relatively large ears, and protuberant eyes. Its head and body length are 2.7 to 3.4 inches with a tail length of 1.6 to 2.3 inches. The upper body is pale gray, the sides and underparts are white, and the tail is white with an incomplete dorsal stripe.

Historically, the Alabama beach mouse was known only from Baldwin County, Alabama, where it was found on coastal dunes form Fort Morgan to Alabama Point, and on Ono Island. Presently survives on disjunct tracts of the sand dune system from Fort Morgan State Park to the Romar Beach area, but has apparently disappeared from most of its original range including all of Ono Island.

The habitat is restricted to the mature coastal barrier sand dunes along the Gulf. The depth of the habitat extending inland may be as much as several hundred meters from the primary dune line, depending on the configuration of the sand dune system and the vegetation present. There are commonly several rows of dunes paralleling the shoreline and occasionally ranging up to 46 feet in height. The beach mice dig burrows mainly on the lee side of the primary dunes and in other secondary and interior dunes where the vegetation provides suitable cover. These mice are seminomadic over a relatively small range, digging as many as 20 burrows into the sand dunes for nesting, food storage, and safety refuges form predators. The mice may also use ghost crab burrows.

The Alabama beach mouse feeds mostly on beach grass and sea oats and on invertebrates, especially in late winter and early spring. The mouse seems to be monogamous as long as both partners remain alive, producing litters about once a month. The litter size ranges from two to seven, averaging about four, with the young reaching reproductive maturity as early as 6 weeks of age. The life span for a related species was estimated at 5 months.

SPECIES STATUS AND TRENDS: Tropical storms and loss of habitat are considered to be primary factors for the mouse's decline. It is estimated that less than half of the original habitat still remains suitable. The major threat to the habitat continues to be human destruction of the coastal sand dune ecosystem for commercial and residential development. In addition, recreational use of the sand dunes by pedestrians and vehicles can destroy vegetation essential for dune development and maintenance. Such loss of vegetation results in extensive wind and water erosion, reducing the effectiveness of coastal dunes as a protective barrier and ultimately destroying beach mouse habitat.

House mice (*Mus musculus*), which are associated with human dwellings, may compete with the beach mouse for food, but the evidence is not conclusive at present. The presence of feral house cats may also pose a threat to beach mouse populations. The absence of a beach mouse population on Ono Island may be attributable to cat predation.

Recent trapping efforts in specific areas of preferred habitat indicate that Alabama beach mice populations are currently stable in those areas. However up to date estimates of population size

are not available. Based on data form 1985 the population was at that time estimated to be about 850 mice.

PESTICIDE/SPECIES INTERFACE: The Alabama beach mouse may be affected by pesticides used to control rodents such as house mice or black rats. Toxic baits placed in or adjacent to areas of preferred habitat would be a potential threat to the beach mouse.

AMARGOSA VOLE (Microtus californicus scirpensis) - E

SPECIES INFORMATION: The Amargosa vole is a small, cinnamon-colored rodent that is a subspecies of the California vole. The range is endemic to Amargosa River drainage of the Mohave Desert. The habitat is marsh habitat of bulrush and saltgrass where the vole feeds on underground parts of plants. This species has small home ranges, all remaining habitats are less than 5 acres in size, vegetation provides microhabitats. It generally remains underground in summer. Critical habitat has been designated on 4,520 acres in the northern Mojave desert of extreme southeastern Inyo County, which is the entire known range of the animal.

SPECIES STATUS AND TRENDS: The exact number of this population is not known. The reasons for decline include loss of wetlands, continued groundwater pumping, and establishment of saltcedar and consequent displacement of food source plants. There is a potential for geothermal development in the area. Most habitats are on private lands. BLM has land use limitations, The Nature Conservancy has a private reserve to manage seeps and marshes that provide water.

PESTICIDE/SPECIES INTERFACE: A golf course is proposed nearby, therefore rodenticides and pesticides could be used in adjacent habitat.

ANASTASIA ISLAND BEACH MOUSE (Peromyscus polionotus phasma) - E

SPECIES INFORMATION: A subspecies of the oldfield mouse (*Peromyscus polionotus*), the Anastasia Island beach mouse has a small body, relatively large ears, and protuberant eyes. One of the largest species of beach mice, it averages 5.4 inches in length and 2.1 in tail length. This beach mouse is much paler than most inland races of oldfield mice. The coloration consists of a light buff colored back, pure white underparts, and indistinct white markings on the nose and face.

The Anastasia Island beach mouse was known historically from the mouth of the St. Johns River, Duval County south to Matanzas Inlet, St. Johns County, Florida. It currently occurs only on Anastasia Island, primarily at the north (Anastasia Island State Recreation Area) and south (Fort Matanzas National Monument) end of the island. The original distribution was over about 50 linear miles of beach; current viable populations occupy only about three linear miles of beach.

This subspecies is restricted to coastal dunes and adjacent inland scrub. The habitat is characterized by sand dunes vegetated with sea oats, dune panic grass or broomsedge, and adjacent inland areas covered by woody vegetation such as palmetto, oak, and sand pine. Little specific information exists about this subspecies burrowing habits, however, they are presumed to be similar to other beach mice species. Burrows are usually located on the sloping side of a dune,

and consist of an entrance tunnel, nest chamber, and an escape tunnel. Individual mice may use up to 20 burrows. Occasionally, beach mice may also use ghost crab burrows.

Beach mice typically feed on the seeds of beach grasses and sea oats. Small invertebrates are probably eaten from time to time, especially in late spring and early summer when seeds are scarce. Beach mice are nocturnal, with most activity occurring on moonlit nights and less activity under stormy conditions or moonless nights. The breeding season appears to start in November and end in early January. The female, which may reach reproductive maturity at 6 weeks of age, produces two to seven beach mice per litter. A female beach mouse can usually produce litters at 26-day intervals, but mortality is high. Most of the progeny will not survive over 4 months.

SPECIES STATUS AND TRENDS: The Anastasia Island beach mouse is primarily threatened by beach and residential development that eliminates suitable habitat. Predators include raccoons, skunks, snakes, and feral dogs and cats. Competitors, such as house mice, are also threats. Estimates on population size include several hundred beach mice occurring at Fort Matanzas National Monument, and a few thousand on all of Anastasia Island. Densities range from 6-50 mice per hectare. Continued loss of suitable habitat will likely result in declining population levels.

SPECIES/PESTICIDE/INTERFACE: The Anastasia Island beach mouse may be affected by pesticides used to control rodents such as house mice or black rats. Toxic baits placed in or adjacent to areas of preferred beach mouse habitat would pose a potential threat to this subspecies.

BLACK-FOOTED FERRET (Mustela nigripes) - E

SPECIES INFORMATION: The Black-footed ferret is a weasel-like mammal that has yellow-buff coloration with black feet, tail tip, and eye mask. The ferret has a body length of 15 to 18 inches. Black-footed ferrets formerly ranged from the Great Plains of Canada to intermontane regions of the interior Rocky Mountains and Southwest in all of portions of the States of Colorado, Arizona, Utah, New Mexico, Kansas, Montana, Nebraska, Oklahoma, Texas, Wyoming, North Dakota, and South Dakota, as well as the Provinces of Alberta and Saskatchewan, Canada. The Meeteetse, Wyoming ferret population was removed and placed at the Wyoming Department's captive breeding facility at the Sybille Wildlife Research and Conservation Educaion Center from 1985 through 1987. There are currently no known wild populations of this species. The likelihood of ferrets being found in the wild is considered low, however, the occurrence of ferrets within the historic range of the species must still be considered possible.

The close association of black-footed ferrets and prairie dogs is well documented. Black-footed ferrets rely on prairie dogs for both food and shelter. Historically, ferrets have been found on grassland plains and surrounding basins up to 10,500 feet elevation. Besides feeding on prairie dogs, which comprise its major food source, ferrets also are known to eat rabbits, mice, voles, ground squirrels, pocket gophers, birds, and insects. It is believed to take an occupied black-tailed prairie dog colony or complex of between 61 and 294 acres (midrange of 104 acres) to support a single ferret, while between 196 and 475 acres of white-tailed prairie dogs is believed to be required to support a single black-footed ferret in white-tailed prairie dog habitat.

SPECIES STATUS AND TRENDS: As stated above, there are currently no known wild populations of black-footed ferrets. There are approximately 130 ferrets located in captive breeding facilities at Sybille near Laramie, Wyoming; Henry Doorly Zoo in Omaha, Nebraska; the Conservation and Research Center near Front Royal, Virginia; the Louisville Zoological Park in Louisville, Kentucky; and the Cheyenne Mountain Zoo in Colorado Springs, Colorado.

Since the turn of the century, the ferret's habitat (prairie dog colonies) has decreased by as much as 98 percent, primarily as a result of land use changes and practices that include prairie dog control. From over 100 million acres in the late 1800's, prairie dog colonies are estimated to have been reduced to about 2 million acres, only a portion of which may be suitable for ferret survival and recovery. As prairie dog colonies become smaller and their spacing more distant, ferret populations likely suffered the following consequences: (1) reduced gene pool; (2) decreased ability to disperse to new colonies; and (3) lowered mating success. If some ferrets still remain in the wild, the probability of their continued survival and viability in the wild is considered low primarily because of the following factors: (1) the catastrophic effect of canine distemper on ferrets and their susceptibility to this disease; (2) the dynamics of ferret habitat (prairie dog colonies as influenced by plague and continued government and private poisoning programs; (3) other stochastic environmental events which may adversely influence the survival of ferrets and their habitats; and (4) the continued segmentation and eradication of the habitat which forces genetic isolation and elimination of food source and habitat of the species. Non-Federal actions that are likely to adversely impact the ferret are those that result in the loss of prairie dog habitat on private lands.

PESTICIDE/SPECIES INTERFACE: Pesticides used to control prairie dogs and other mammals or that are toxic directly or indirectly to mammals are likely to continue to adversely impact the black-footed ferret either through direct toxicity or indirectly through the loss of the ferrets food source.

CAROLINA NORTHERN FLYING SQUIRREL (Glaucomys sabrinus coloratrus) - E

SPECIES INFORMATION: The Carolina northern flying squirrel is a small nocturnal gliding mammal some 260 to 305 millimeters (10 to 12 inches) in total length and 95 to 140 grams (3-5 oz.) in weight. It possesses a long, broad, flattened tail (80 percent of head and body length), prominent eyes, and dense, silky fur. The broad tail and folds of skin between the wrist and ankle form the aerodynamic surface used for gliding. Adults are gray with a brownish, tan, or reddish wash on the back, and grayish white or buffy white ventrally. Juveniles have uniform dark, slategray backs, and off-white undersides. The northern flying squirrel can be distinguished from the southern flying squirrel by its larger size; the gray base of its ventral hairs as opposed to a white base in the southern species; the relatively longer upper tooth row; and the short, stout baculum (penis bone) of the males. The closest relative of the northern flying squirrel is *Glaucomys sabrinus fuscus*, also classified as endangered. *G. s. fuscus* is known only from a few areas in Virginia and West Virginia.

The northern flying squirrel is known from five isolated localities: three in the western mountains of North Carolina (Yancey County, Haywood County, and in the vicinity of Mt. Mitchell (exact county undetermined)), and two localities in the eastern mountains of Tennessee (Carter and Sevier Counties). The northern flying squirrel is typically a species found in more northern areas,

and it was well into the 20th century before the species was found to occur in the eastern United States to the south of New York. The northern flying squirrel was first described from specimens taken in the Appalachians of eastern Tennessee and western North Carolina. Only a very few specimens have been captured since that time. It is possible that this subspecies may have been declining since the last ice age, when the climate slowly began warming and left the remaining suitable habitat limited to a few scattered areas at high elevations. No population estimates are available, but the northern flying squirrel seems to be extremely rare, and also extremely difficult to collect and study. Most captures have come from Roan Mountain on the North Carolina and Tennessee border, where a total of 25 individuals have been taken since 1968.

The northern flying squirrel occurs primarily in the ecotone, or vegetation transition zone, between the coniferous and northern hardwood forests. Both forest types are used in the search for food, while the hardwood areas are needed for nesting sites. Because of the flying squirrel's small size, the climatic severity of its habitat, and the abundance of avian and mammalian predators, nesting sites represent critical resources. During the cooler months, squirrels commonly occupy tree cavities and woodpecker holes, but may also construct and use leaf nests especially in the summer. The interior of both types of nests is lined with lichens, moss, or finely chewed bark. Preliminary results from a study presently underway in West Virginia indicate that these squirrels sometimes enter burrows in the ground, although the extent of their use is not yet known.

Over much of its range, the northern flying squirrel can apparently subsist on lichens and fungi, but also eats certain seeds, buds, fruit, staminate cones, insects, and other animal material.

Little reproductive information is available for this subspecies. Investigators working with more northern subspecies mention two litters of 2 to 6 young per year and a gestation period of 37 to 42 days). However, trapping data from the southern Appalachians suggest a single annual litter in early spring. Two captive females taken in North Carolina each bore four young. Northern flying squirrels are relatively gregarious and are known to share nests; however, the spectacular winter nesting aggregations reported for the southern flying squirrel (up to 50 in a nest) are unknown for this species. Northern flying squirrels apparently live in family groups of adults and juveniles, for in those areas where the species has been located, it has often been possible to trap two to six individuals within a 300 by 400 meter area.

SPECIES STATUS AND TRENDS: Because the northern flying squirrel is adapted to cold, boreal conditions, its range has probably been shrinking due to natural conditions since the last ice age. Populations are now restricted to isolated areas at high elevations, separated by vast areas of unsuitable habitat. In these last occupied zones, the squirrel and its habitat are coming under increasing pressure from human disturbance, such as logging and development of skiing and other recreational facilities.

Logging and other clearing activity has also resulted in the colonization of former northern flying squirrel habitat by the southern flying squirrel. Regrowth in cleared areas, if any, has tended to be deciduous forest favored by the more aggressive southern flying squirrel. Recent research on captive animals suggests that the northern flying squirrel may be displaced by the southern subspecies in certain hardwood habitats where their ranges overlap The southern flying squirrel, though smaller than the northern flying squirrel, is more aggressive, more active in territorial defense, and dominant in competition for nests. When the two squirrels meet in an ecotone

between coniferous and deciduous forest, the southern subspecies would be expected to force the northern flying squirrel out into the purely coniferous zone, which lacks favorable nesting sites and would therefore reduce reproduction by the northern flying squirrel. Also, the southern flying squirrel is apparently the natural host for a nematode parasite, *Strongeloides robustus*, and has developed an immunity to its ill effects. However, when the northern and southern flying squirrels were held together in captivity, the parasite was transferred to the nothern flying squirrel with lethal results. Recent contact between the two squirrels, as a result of habitat disruption, has created conditions suitable for spreading the parasite to the northern flying squirrel and may be contributing to its demise.

PESTICIDE/SPECIES INTERFACE: The Carolina northern flying squirrel would most likely be affected by pesticides applied within the species' occupied habitat. Where forestry, rights-of-way, agricultural activities, and other land use changes encroach on the species' habitat, there would be potential for the squirrel to come in contact with rodenticides and insecticides. Broadcast application of flavored poisoned bait would pose a significant threat to the squirrel.

CHOCTAWATCHEE BEACH MOUSE (Peromyscus polionotus allophrys) - E

SPECIES INFORMATION: The Choctawhatchee beach mouse has a small body, haired tail, relatively large ears, and protuberant eyes. Head and body length is 2.7 to 3.5 inches; tail length is 1.7 to 2.5 inches. The upper parts are colored orange-brown to yellow-brown, the underparts are white, and the tail has a variable dorsal stripe.

Historically known from Okaloosa, Walton and Bay Counties, Florida, the Choctawhatchee beach mouse was originally found along the Gulf on mature coastal dunes between Choctawhatchee and St. Andrew Bays. Its current distribution is apparently limited to two areas: (1) approximately 4.9 miles of beach from around Morrison Lake eastward to Stalworth Lake (Topsail Hill area, Walton County), and (2) Shell Island at St. Andrews Bay in Bay County.

The habitat is restricted to the mature coastal barrier sand dunes along the Gulf. The depth of the habitat extending inland may vary depending on the configuration of the sand dune system and the vegetation present. There are commonly several rows of dunes paralleling the shoreline and within these rows there are generally three types of micro-habitat. The frontal dunes are sparsely vegetated with sea oats, bunch grass, beach morning glory and railroad vine. The interdunal areas contain sedges, rushes and salt-grass. The dunes farther inland support growths of slash pine, sand pine, scrubby shrubs and oaks.

The beach mice dig burrows mainly on the lee side of the primary dunes and in other secondary and interior dunes where the vegetation provides suitable cover. The mice may also use ghost crab burrows. A nocturnal herbivore, this beach mouse probably feeds primarily on the seeds of sea oats and bunch-grass. Arthropods are eaten seasonally in spring and summer.

A population of Choctawatchee beach mice is capable of producing a maximum of six generations per year. Breeding may occur at any time, but reaches its peak during fall and winter. Litter size may range from two to seven. Their average lifespan is 180 days. Females reach sexual maturity at 6 weeks of age.

SPECIES STATUS AND TRENDS: Destruction of Gulf coast sand dune ecosystems for commercial and residential development has destroyed about 60 percent of the original habitat. A 1979 survey indicated that the beach mouse had been extirpated from 7 of 9 previously known habitat areas, although this loss was mitigated somewhat by the discovery of a new population on Shell Island. Results of this survey also suggested that the house mouse, through competition for food and cover, may have displaced the beach mouse in the mainland portion of St. Andrews State Recreation Area (across the channel from Shell Island). Human dwellings in the vicinity of beach mouse habitat serve as points of introduction for house mice. Predation by feral house cats associated with residential development may also occur.

Tropical storms periodically devastate sand dune communities, dramatically altering or destroying habitat, drowning beach mice, and concentrating the mice on high scrub dunes where they are exposed to predators. Habitat loss and fragmentation from development increases the potential impact from this threat.

In 1979, the species' total population was conservatively estimated at 515, consisting of 357 beach mice on Shell Island, and 158 mice in the Topsail Hill area. In addition to that estimate, in 1987-88, thirty Choctawhatchee Beach Mice were reestablished on Grayton Beach State Recreation Area. Surveys indicate that these mice are reproducing.

PESTICIDE/SPECIES INTERFACE: The Choctawhatchee beach mouse may be affected by pesticides used to control rodents such as house mice and black rats. Toxic baits placed in or adjacent to beach mice habitat would be a potential threat.

DELMARVA PENINSULA FOX SQUIRREL (Sciurus niger cinereus) - E

SPECIES INFORMATION: The Delmarva Peninsula fox squirrel is a large squirrel, weighing up to two pounds. Its coat is a light, grizzled, grayish color with a steel-blue cast dorsally and a white cast ventrally. The feet are white and the tail has a pronounced black stripe on the outer edge. The squirrel is presently restricted to local disjunct populations found on the Delmarva Peninsula in Maryland, Virginia, and Delaware. This species is found mostly in mixed stands of mature (mast-producing) hardwoods. Habitats include groves of trees along streams and in agricultural areas, and mature loblolly pine forests adjacent to salt marshes. The Delmarva fox squirrel feeds heavily on mast-producing trees, such as oak, hickory, beech, walnut and loblolly pine. During the spring, they feed extensively on buds and flowers of trees, and will also consume fungi, insects, fruit, seeds, and occasionally bird eggs and young. Two peaks occur during the breeding season -- one in February/March and the other in July/August. The fox squirrels are polygamous, and the female raises the average litter of three by herself, usually in a tree den. The young are weaned between nine to twelve weeks of age.

SPECIES STATUS AND TRENDS: Populations exist at Blackwater, Eastern Neck, Chincoteague, and Prime Hook National Wildlife Refuges, totaling approximately 800 in 1987. Populations on state and private land are not known. The Delmarva fox squirrel is adversely impacted by destruction of its mature woodland habitat from timber cutting, agricultural clearing, construction and development, and competition with the gray squirrel.

PESTICIDE/SPECIES INTERFACE: Delmarva fox squirrels are not normally affected by most pesticides, because they consume foods in the mature stage after pesticide application may occur.

However, there is the possibility of accidental poisoning through ingestion of granules or drinking water having dissolved pesticide material in solution. Exposure to certain rodenticides might also pose a risk.

FLORIDA PANTHER (Felis concolor coryi) - E

SPECIES INFORMATION: The Florida panther is a large, long-tailed cat with a great deal of color variation: pale brown or rusty upper parts, dull white or buffy under parts; tail tips, back of ears, and sides of nose dark brown or blackish. Mature male panthers examined in the wild in Florida since 1978 have weighed from 106 to 154 pounds, and measured nearly 7 feet from nose to tip of tail. Females were considerably smaller, with a weight range of 65 to 100 pounds and measuring about 6 feet. Data on panther kitten development indicate that males 6-10 months of age weighed in at 34-55 pounds; 14-19 months, 85-86 pounds; and 24-36 months, 92-93 pounds. Females 6-10 months weighed 31-49 pounds; 14-20 months, 56-70; and 24-48 months, 50-80 pounds.

The historic range included eastern Texas or western Louisiana and the lower Mississippi River valley east through the Southeastern States in general (Arkansas, Louisiana, Mississippi, Alabama, Florida, Georgia, and parts of Tennessee and South Carolina). Even though numerous sighting reports continue to surface annually throughout its historic range, it is unlikely that viable populations of the Florida panther presently occur outside Florida. In general, panther population centers appear to indicate a preference toward large remote tracts with adequate prey, cover, and reduced levels of disturbance. A telemetry study on the Florida panther was initiated in south Florida by the Florida Game and Fresh Water Fish Commission (Commission) in 1981. This initial study has since been expanded by the Commission, and the National Park Service initiated additional studies in 1986. One of the goals of these telemetry projects is to learn more about panther habitat. As of July 1989, data had been gathered from 33 radio-instrumented panthers.

Data from panthers monitored by the Commission in southwest Florida since 1985 indicate that, overall, habitat use is highly diverse and varies from north to south. Diversity of habitats used by panthers is greater in northern parts of the study area and dominated by uplands (hardwood hammocks, low pinelands, and palm forests). Lower diversity and predominately wetland habitat use are characteristic of southern areas (mixed swamp and cypress swamp). Appropriate cover is an important component of habitats used, especially during hunting, denning and day-bedding. Saw palmetto was the dominant cover in 72 percent of observed day bedding-sites. Home range sizes of 13 instrumented panthers in southwest Florida averaged 255 square miles for adult males and 135 square miles for adult females.

Preliminary analyses of panther diets in the southwest Florida study area indicate they subsist on a variety of mammalian prey dominated by white-tailed deer, wild hog, and in some areas raccoon. Analysis of 83 scats and 22 kills since 1986 indicate a difference in food habits between the north and south portions of the study area. Deer and hogs accounted for 42 percent and 22 percent, respectively, in the south, and 23 percent and 63 percent, respectively, in the north. Occurrence of small prey appeared similar between areas.

Only preliminary data is available on Florida panther reproduction. Existing data indicates a breeding season of November to April, a gestation period of around 90-95 days, litter sizes of 1-4

kittens, a breeding cycle of 2 years for females, and kitten dispersal at 18 months. A female has successfully reproduced at 22-23 months, and a male has possessed fertile sperm and exhibited reproduction at 26-30 months. Male panthers examined to date exhibit an exceedingly high proportion of abnormal sperm forms (more than 90 percent), with the major defect involving the acrosome or head of the spermatozoa. In addition, 4 to 12 (33 percent) males examined since 1984, have exhibited cryptorchidism (one testicle does not descend properly into the scrotum). As part of the genetic preservation effort, a sperm bank was established in 1988, to cryopreserve (freeze-store) semen collected from free-ranging males.

SPECIES STATUS AND TRENDS: The only known viable population occurs in south Florida, generally within the Big Cypress Swamp and Everglades physiographic region in Collier, Dade, Glades, Hendry, Lee, and Monroe Counties. Scattered verified sign has recently been documented (late 1980's) along the St. Johns River drainage from northern Okeechobee County north to southern Putman County. Telemetry data suggests the present population of panthers may be at or near the carrying capacity for existing habitat conditions. Currently, the wild population is estimated to be 30-50 animals. However, the death of even one panther would pose a serious threat to the species' survival. Losses could result in population reduction below a level necessary to maintain the demographic and/or genetic health of the species. The status of the panther is further exacerbated by the cumulative effects of human encroachment including current and proposed agricultural and mining operations impacting available habitat.

PESTICIDE/SPECIES INTERFACE: Although the opportunity for the panther to come in contact with pesticides is remote because of the species habits, there are several possible routes of exposure. Panthers may prey on cattle treated for pest control or scavenge on dead livestock that had been treated; secondary poisoning by scavenging on poisoned rodents or birds can occur when the panthers typical large prey species are scarce; because these big cats occasionally venture outside a given home range, contact with pesticide treated citrus groves, sugarcane or other crop fields may also occur.

FLORIDA SALT MARSH VOLE (Microtus pennsylvanicus dukecampbelli) - E

SPECIES INFORMATION: The Florida salt marsh vole is a small (178-198 mm in total length), short-tailed rodent with a blunt head and short ears. Its fur is black-brown dorsally and dark gray ventrally. It is closely related to the meadow vole (M. p. pennsylvanicus) but can be distinguished by its larger size, darker coloration, relatively small ears, and by certain skull characteristics.

The Florida salt marsh vole is known only from one site at Waccasassa Bay in Levy County, Florida, where it is found in a salt marsh with vegetation consisting of smooth cordgrass, black rush, and saltgrass. Very little is known about the species' biology and life history. It is presumed that the Florida salt marsh vole feeds primarily on seeds and succulent plant parts.

SPECIES STATUS AND TRENDS: The Florida salt marsh vole presently exists only in extremely low numbers (only one salt marsh vole was found during intensive trapping in 1987 and 1988) and has a very restricted range. Any natural or human induced adverse impact to this species could result in its extinction.

PESTICIDE/SPECIES INTERFACE: Pesticide use for rodent control and/or mosquito control could potentially occur within or adjacent to the Florida salt marsh vole's habitat and could pose a

serious threat to this species. Exposure to rodenticides would likely occur through ingestion of poison baits; and exposure to other pesticides could occur through ingestion of food items contaminated by direct spray application or drift deposition of the pesticides.

GRAY WOLF (Canis lupus) - E/T

SPECIES INFORMATION: The Gray wolf occurs as a result of natural recolonization which is presently occurring in Idaho, north-central Washington, and northwestern Montana. Successful reproduction of wolves has been recorded in southeast British Columbia, Canada, along the North Fork of the Flathead River, Glacier National Park, and other areas in northwest Montana, and the north Cascades of Washington. The gray wolf also inhabits the northeastern third of Minnesota, portions of the northern third of Wisconsin, and portions of the Upper Peninsula and Isle Royale of Michigan.

The key components of wolf habitat include: (1) a sufficient, year-round prey base of ungulates (big game) and alternate prey, (2) suitable and somewhat secluded denning and rendezvous sites, and (3) sufficient space with minimal exposure to humans. The primary prey for wolves in Minnesota, Wisconsin, and Michigan include deer, moose, and beaver as are wolves in the Rocky Mountains which also feed on elk, bison, ground squirrels, snowshoe hare, and grouse. On a biomass basis, ungulates comprise the bulk (more than 90 percent) of the wolves' diet during summer and fall in the Rocky Mountains.

In the Northern Rockies, wolf pups are born any time from late March to late April or possibly early May. Most wolves appear particularly sensitive to human activity near den sites and may abandon them if disturbed.

SPECIES STATUS AND TRENDS: The wolf population in and adjacent to Montana as of March 1991 is estimated to be about 50 wolves in 5 packs. No more than 15 wolves were believed to be present in central Idaho as of August 1987. There are no recent population figures for the gray wolf (eastern timber wolf) but it is estimated that there are approximately 1,200 to 1,300 of these wolves occurring in Minnesota, Wisconsin, and Michigan. The population decline of the eastern timber wolf was a result of (1) intensive human settlement, (2) direct conflict with domestic livestock, (3) a lack of understanding of the animal's ecology and habits, (4) fears and superstitions concerning wolves, and (5) the extreme control programs designed to eradicate the wolf. These factors apply to the decline in all wolf populations in the United-States. Reasons for the decline of the Northern Rocky Mountain wolf also are given as land development, loss of habitat, poisoning, trapping, and hunting. Non-Federal actions adversely impacting the wolves include primarily hunting and trapping of wolves on non-federal lands.

SPECIES/PESTICIDE INTERFACE: Pesticides used to control coyotes (e.g., sodium cyanide, sodium fluroacetate) and other mammals (e.g., ground squirrel control) could adversely impact the gray wolf.

GRIZZLY BEAR (Ursus arctos horribilis) - T

SPECIES INFORMATION: Grizzly bear populations in the conterminous United States are restricted to northcentral and northeastern Washington, northern and eastern Idaho, western Montana, and northwestern Wyoming. Only six areas are known to sustain either self-

perpetuating or remnant populations, excluding southern Colorado, where a grizzly bear was killed in the fall of 1979 in a remote section of the San Juan National Forest. These areas include the Yellowstone Grizzly Bear Ecosystem (YGBE), the Northern Continental Divide Grizzly Bear Ecosystem (NCDGBE), the Cabinet-Yaak Grizzly Bear Ecosystem (CYGBE), the Selkirk Mountains Grizzly Bear Ecosystem (SMGBE), the Selway-Bitterroot Grizzly Bear Ecosystem (SBGBE), and the North Cascades Grizzly Bear Ecosystem (NCGBE).

The primary components of grizzly bear habitat include food, cover, and denning habitat. Grizzly bears are successful omnivores, and in some areas may be almost entirely herbivorous. Grizzly bears must avail themselves for foods high in protein or carbohydrates in excess of maintenance requirements in order to survive denning and post-denning periods. They are opportunistic feeders and will prey or scavenge on almost any available food including ground squirrels, ungulates, carrion, and garbage. This search for food is a prime influence on movements. Upon emergence from the den, they seek the lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges, where their food requirements can be met.

Limited reproductive capacity of grizzly bears precludes any rapid increase in the population. Mating appears to occur from late May through mid-July, with a peak in mid-June. The age of first reproduction and litter size varies and may be related to the nutritional state of the bear. Litter sizes range from 1 to 4 with the mean of about 2.

SPECIES STATUS AND TRENDS: The current population of grizzly bears is estimated at between 800 and 1,000 bears. The YGBE population is estimated at between 200 and 350 while the NCDGBE population is believed to be between 440 and 680 bears. The decline in the bear population has been related to habitat loss and direct and indirect human-caused mortality. Most of the actions adversely impacting the grizzly bear occur on Federal lands. Some non-Federal actions that would adversely impact the grizzly bear include habitat destruction and direct human-caused mortality (e.g., both legal and illegal shooting of bears) on private lands.

PESTICIDE/SPECIES INTERFACE: Pesticides toxic to mammals and especially those toxicants use to control coyotes and other mammals could adversely impact the grizzly bear directly or indirectly by reducing the grizzly bears' food source.

HUALAPAI MEXICAN VOLE (Microtus mexicanus hualpaiensis) - E

SPECIES INFORMATION: The Hualapai Mexican vole is a small cinnamon-brown, mouse sized mammal with a short tail and long fur that nearly covers its small, round ears. The Hualapai vole is one of three subspecies found in Arizona. The hualapai vole is now found only in moist, grass/sedge along permanent or semi-permanent waters, but may be capable of occupying drier areas when grass/forb habitats are available. This species probably feeds on green plant material when available. Hualapai voles have been observed during both day and night and are likely active year-round. No data exist on the reproductive biology of this species although they are assumed to be similar to other subspecies which have small litters.

This species is known from only the Hualapai Mountains in Mohave County, Arizona. Three general locales that total 255 acres have been identified as vole habitat. Three populations have been located within these areas and a fourth population in Pine Canyon has been reported south of the known locales.

SPECIES STATUS AND TRENDS: The Hualapai vole is extremely rare and has among the most restricted habitats of any North American mammal. From 1923 to the present, only 15 specimens are known to have been captured in the Hualapai Mountains. The most recent status survey investigated 59 potential sites but found voles in only 2 places and sign alone in one other. Each site was only 3-5 meters across and 75-400 meters long. These areas are thought capable of supporting a minimum of 44 voles. Past incompatible land management practices and periods of drought have combined to cause the deterioration of most of the habitat of the vole. The present main threat to the habitat appears to be the elimination of ground cover or grasses, sedges, rushes and forbs around open water and seeps, primarily by grazing and heavy recreational use.

PESTICIDE/SPECIES INTERFACE: This species could be adversely impacted from the use of rhodenticides, insecticides, or herbicides within occupied habitat.

JAGUARUNDI (Felis yagouaroundi cacomitli) - E

SPECIES INFORMATION: The Jaguarundi is a long-bodied, short-legged, uniformly colored cat. It measures 35 to 54 inches (90 to 137 cm) from head to tail, with the tail nearly as long as the head and body. Its pelt is either reddish or bluish gray. It is about twice the size of the ordinary house cat and weighs 15 to 18 pounds (7 to 8 kg) as an adult. The females are smaller than the males. The jaguarundi is chiefly nocturnal but also hunts by day. It feeds mostly on small birds and mammals. It climbs trees and is able to pursue its prey through dense underbrush. It follows regular trails to drinking places. The young have been observed in both summer and winter, suggesting that they have no regular breeding time or produce two litters per year. Two or three young are produced at a time. The jaguarundi live in brushy areas and thorn thickets. In the United States, they are only found in extreme southern Texas. There is no federally designated critical habitat. The U.S. Fish and Wildlife Service's "Counties of Occurrence" list includes Bee, Cameron, Hidalgo, Jim Wells, Kennedy, Kleburn, San Patricio, and Willacy Counties, Texas.

SPECIES STATUS AND TRENDS: Jaguarundi apparently migrated to southern Texas from South America by way of Mexico and established a small population. Their numbers are extremely low in the United States.

PESTICIDE/SPECIES INTERFACE: Because of the intensive agriculture surrounding and interspersed with the habitat it is highly likely that a number of the chemicals considered in this request will affect this species.

KEY LARGO COTTON MOUSE (Peromyscus gossypinus allapaticola) - E

SPECIES INFORMATION: A small mouse, the Key Largo cotton mouse is brown on top with white underparts. It has large ears, proturberant eyes, and a furry tail. Evidence indicates that most cotton mice live less than a year.

This species was once known throughout the uplands of Key Largo, Monroe County, Florida. Currently, however, it is restricted to approximately the northern one-third of this area. In 1970, the mouse was introduced into the Lignumvitae Key State Botanical Site. Its present status there is uncertain because a 1984 trapping effort failed to detect the species. An estimated 18,000 cotton mice may still exist in the remaining 2,100 acres (851 hectares) of forested habitat on north Key Largo. The Key Largo cotton mouse is most abundant in mature, tropical, hardwood

hammocks with trees of 10 to 12 inches trunk diameter. It is rarely found in young or recovering hammocks. Common plant species in typical habitat are gumbo-limbo (Bursera simaruba); pigeon plum (Cocoloba diversifolia); soldierwood (Colubrina elliptica); crabwood (Gymnanthes lucida); black ironwood (Krugiodendron ferreum); wild coffee (Pschotria undata); marlberry (Ardisia escallonioides); and white stopper (Eugenia axillaris). Hammock vegetation develops only on the higher ground, 6 to 15 feet above sea level. At lower elevations there is a rapid transition to mangrove wetlands.

This mouse is a noctural feeder, existing on the buds, fruits, and seeds of many plant species. Based on one study reproduction is seasonal and apparently begins in June. The mice construct small, spherical, leaf-lined nests in logs, tree hollows, and crevices in the limestone rock. Females have two or three litters a year, with litter sizes ranging from two to six young and averaging four. Weaning takes place at about 4 weeks of age. Females are ready to mate when slightly over 70 days old.

SPECIES STATUS AND TRENDS: Destruction and alteration of tropical hardwood hammock forest have been identified as the primary factors in the extirpation of the Key Largo cotton mouse from the southern part of Key Largo. Pressure for development will continue to be a threat.

PESTICIDE/SPECIES INTERFACE: The Key Largo cotton mouse would be most vulnerable to rodent control agents used for black and Norway rats and house mice. Toxic baits placed in or near the cotton mouse habitat would be a potential threat to the species.

KEY LARGO WOODRAT (Neotoma floridana smalli) - E

SPECIES INFORMATION: The Key Largo woodrat is a medium-sized (200-260 gram) rat with a gray-brown back and head. Its belly, chest, and throat are white, and the tail is hairy. This species once ranged throughout Key Largo, but now is restricted to about the northern one-third of the area. The woodrat was introduced into Lignumvitae Key, a State botanical site, in 1970; but, populations there were estimated to be very low in 1988. An estimated 6,500 woodrats still exist in the remaining 851 hectares (2,100 acres) of forested habitat on north Key Largo. The Key Largo woodrat is most abundant in mature, tropical, hardwood hammocks with trees of 10 to 12 inches trunk diameter, and is rarely found in young or recovering hammocks. Common plant species in typical habitat are gumbo-limbo (Bursera simaruba); Pigeon plum (Cocoloba diversifolia); soldierwood (Colubrina elliptica); crabwood (Psychotria undata); marlberry (Ardisis escallonioides); and white stopper (Eugenia axillaris). Hammock vegetation develops only on the higher ground, 6 to 15 feet above sea level. At lower elevations there is a rapid transition to mangrove wetlands. In mature hammocks, woodrats occur at a density of about 0.8 to 1 animal an acre and have a home range of about 0.6 of an acre.

This species is a nocturnal herbivore, feeding on the buds, leaves, and fruit of many plant species. Food may be stored in its stick nests. Like other members of its genus, the Key Largo woodrat builds one or more large stick houses for protection from predators and for nesting. The nests are made of dead limbs and sticks, but they may contain miscellaneous articles (glass, metal, paper, bones). Nests may be used for several generations and become as large as 4 feet high and 6 to 8 feet in diameter. The interior of the nest contains a small globular nest chamber made of plant fibers and grasses. Several entrances lead to the next chamber. One woodrat may utilize

several nests, but adults do not nest together. Females have two litters a year, consisting of one to four young with an average of two. Sexual maturity occurs at about 5 months of age.

SPECIES STATUS AND TRENDS: Destruction and alteration of tropical, hardwood hammocks have been identified as the primary factors in the extirpation of the Key Largo woodrat from the southern part of Key Largo. There are presently several residential projects planned or under construction on northern Key Largo in areas near or within woodrat habitat. Pressure for development is expected to be a continuing threat in the future.

PESTICIDE/SPECIES INTERFACE: The Key Largo woodrat would be susceptible to rodenticides used to control black and Norway rats. Toxic bait placed in or near the woodrat's habitat could pose a threat to the woodrat.

LOUISIANA BLACK BEAR (Ursus americanus luteolus) - T

SPECIES INFORMATION: The Louisiana black bear is a large, bulky mammal with long black hair, with occasional brownish or cinnamon color phases. The tail is short and well haired. The facial profile is rather blunt, the eyes small and the nose pad broad with large nostrils. The muzzle is yellowish brown and a white patch is sometimes present on the lower throat and chest. There are five toes on the front and hind feet with short curved claws. Large males may weigh more than 600 pounds but weight varies considerably throughout the species range. Its skull can be distinguished from other black bears in that it is relatively long, narrow, and flat in comparison, and has proportionately large molar teeth.

The Louisiana black bear historically occurred throughout southern Mississippi, eastern Texas, all of Louisiana and possibly the southern most counties of Arkansas. However, it is now confined to small numbers in Mississippi close to the Mississippi River, and to core populations in the Tensas and Atchafalaya River basins in Louisiana. Only large stands of woodlands (bottomland hardwoods) are considered as bear habitat, though marshes and agricultural fields (sugarcane, soybeans) are also used by the Louisiana black bear. The Louisiana black is omnivorous and will forage on most any vegetable or animal food item it can find or catch, including carrion.

SPECIES STATUS AND TRENDS: The Louisiana black bear has suffered extensive habitat loss and modification, with suitable habitat having been reduced by more than 80 percent by 1980. As of 1991, this percentage is likely much higher. In 1980, it was estimated that only 5,000,000 of the original 25,000,000 acres of bottomland forest in the Mississippi River Valley remained, with another 165,000 acres being lost each year. Presently, only approximately 100,000 acres (15%) of the original stands of the once extensive bottomland forests of the Tensas basin remain; and in the Atchafalaya basin only about 518,000 acres remain in the lower portion of the basin and only 100,000 to 128,000 acres in the upper or northern portion. Due to the difficulties in accurately censusing bear numbers, present population levels within these river basins are unknown but are expected to continue declining as remaining habitat is cleared and reduced in quality by fragmentation due to construction, forestry, and agricultural activities.

PESTICIDE/SPECIES INTERFACE: The Louisiana black bear would primarily be affected by pesticides used for rodent or predator control and those pesticides applied to livestock to control insect infestations. Due to the bear's opportunistic feeding habitats, there exists a potential for direct poisoning due to ingestion of poison baits and secondary poisoning from ingestion of

MORRO BAY KANGAROO RAT (Dipodomys heermanni morroensis) - E

SPECIES INFORMATION: The Morro Bay kangaroo rat is a species is a small rodent weighing about 50-70 grams (mean 66 g). In 1922, habitat for the species was less than 4 square miles at Morro Bay, California. By 1980, less than 320 acres in four parcels remained. A 50-acre California Department of Fish & Game Reserve at Morro Dunes has no remaining animals. Also none remain in Montana de Oro State Park's 70-acre reserve. Habitat includes coastal dune scrub, without a thick, woody overstory. Also, the vegetative cover includes a patchy, but significant unvegetated sand component. This species feeds on buckwheat, croton, other forbs. Breeding season is generally between March-October, but young are known to occur at other times of the year as well. Estrus occurs 18-20 days, and gestation 30-33 days. This is a subspecies of the Heermann's kangaroo rat.

SPECIES STATUS AND TRENDS: the status of the species is unknown, but the population occurs only on one privately owned parcel. This population was censused in 1985. At that time the population was estimated to comprise less than 50 individuals. This last wild population occurs on approximately 50 acres of a 200 acre location in Los Osos. Individuals in the captive colony all appear to be past reproductive age. Reasons for decline are habitat loss and fragmentation. Anticipated trends are an HCP in progress with the Service and San Obispo County. However, both HCP and recovery efforts are currently frustrated by landowner refusal to allow resource agency personnel on the property containing the last known population. Non-Federal impacts to this species include additional habitat loss and degradation.

PESTICIDE/SPECIES INTERFACE: Rodenticides and other pesticides can affect remaining animals. Interface is unknown due to inability of access to the species.

OCELOT (Felis pardalis) - E

SPECIES INFORMATION: The Ocelot is a medium-sized cat, tawny in color, with dark, elongated markings. Its head and body are 27 to 35 inches (69 to 89 cm) long, and its tail is 13 to 15 inches (33 to 38 cm) long. The cat weighs 20 to 40 pounds (9 to 18 kg). The young are born in the autumn, normally two in a litter. The ocelot is believed to be nocturnal. It preys on rabbits, wood rats, mice, and occasionally domestic animals. The U.S. ocelot population is estimated to be 12 to 60 animals. This cat is found only in Cameron County, Texas, on approximately 50,000 acres (20,200 hectares) of native brushland; it is fond of dense thickets of thorny shrubs. Approximately 30,000 of these acres (12,000 hectares) are privately owned, currently used for lease hunting and livestock grazing (cattle and goats). The remaining 20,000 acres (8,090 hectares) are in the Laguna Atascosa National Wildlife Refuge. The U.S. Fish and Wildlife Service's "Counties of Occurrence" list include Cameron, Hidalgo, Kleberg, Jim Wells, Kennedy, Starr, Willacy, and Zapata Counties, Texas.

SPECIES STATUS AND TRENDS: The loss of habitat caused by the clearing of brush for citrus, cotton, and vegetables has contributed greatly to the decline of the occlot in Texas. The ocelot's great commercial value has contributed to increased poaching and other illegal activities.

contaminated prey, so use of these pesticides in bear habitat is a potential threat to this subspecies. Some contact with pesticides used on sugarcane or other crops may also occur.

LOWER KEYS RABBIT (Sylvilagus palustris hefneri) - E

SPECIES INFORMATION: The Lower Keys rabbit is a subspecies of the marsh rabbit, a species widespread in the southeastern U.S. The Lower Keys rabbit is distinguished from other rabbits, in skull proportions and sculpturing and in its darker coloration. The Lower Keys rabbit is about sixteen inches in length, with brownish dorsal and greyish ventral fur. The rabbit is most active at night, in early morning or late afternoon, or during overcast weather. It feeds on a variety of plants, including leaves, shoots, buds, and flowers of grasses, herbaceous, and woody plants. Breeding behavior includes chasing of inferior males and receptive females by dominant males. In late summer, adult rabbits may chase young from the nest area. The Lower Keys rabbit builds mazes of runs, dens, and nests in its coastal (saline to brackish) or freshwater, inland marsh habitats. Two plant species, fringe rush and bottonwood, are always present in the rabbit's habitat. In freshwater marshes, cattails and sedges are common associates. Sometimes, spikerush is also found. In coastal marshes, common associates include cordgrass, saltwort, glasswort, sawgrass, and sea oxeye. The rabbit's runs, dens and nests are made in cordgrass or sedges. Nests are lined with belly hair.

SPECIES STATUS AND TRENDS: This species originally ranged throughout the larger, lower Florida Keys. Presently, the rabbit is known from only 13 sites on lower Sugarloaf, Welles, Annette, Hopkins, Geiger, Boca Chica, and Big Pine Keys. Historically, the species may also have existed on Cudjoe, Ramrod, Middle Torch, Big Torch, and Key West Keys; but, it has been extirpated from these areas. The species is known to have occurred on Saddlebunch, but because most of the appropriate habitat has been destroyed, it probably has been extirpated there. Known localities for the rabbit are on privately-owned land; State land owned by the Florida Department of Transportation; and Federal land owned by the National Key Deer Refuge or the Key West Naval Air Station. The current population of the species, based on pellet counts, is estimated at 259 individuals.

Natural marsh habitats are limited in the Florida Keys, and have declined due to development. Since the rabbit occurs in small, relatively disjunct populations, has a low population density, and does not occur east of the Seven Mile Bridge, the species is in danger of extinction. Predation by introduced house cats is a problem. Some road mortality occurs as rabbits attempt to move among increasingly isolated Lower Keys marshes. In the past, the Lower Keys rabbit was often hunted by man; this is not known to be a current threat. A U.S. Navy-sponsored study is underway at Boca Chica Naval Air Station to determine the basic biological needs of the species, and to determine what management would be beneficial.

PESTICIDE/SPECIES INTERFACE: The Lower Keys rabbit may be exposed to pesticides used for mosquito control in areas of marsh habitat. Direct contact with treated areas and ingestion of contaminated water are likely routes of exposure. The rabbit may also come in contact with rodenticides used for control of black and Norway rats or mice in areas adjacent to the rabbit's habitat. Broadcast poison baits would be particularly hazardous to the rabbit.

PESTICIDE/SPECIES INTERFACE: Because of the intensive agriculture interspersed with and surrounding ocelot habitat, it is highly likely that a number of chemicals (especially vertebrate control agents) will adversely affect this species.

PERDIDO KEY BEACH MOUSE (Peromyscus polionotus trissyllepsis) - E

SPECIES INFORMATION: A subspecies of the oldfield mouse (*Peromyscus polionotus*), the Perdido Key beach mouse has a small body, haired tail, relatively large ears, and protuberant eyes. Its head and body length is 2.7 to 3.3 inches; the tail length is 1.7 to 2.5 inches. The upper parts are colored grayish fawn to wood brown with a very pale yellow hue and an indistinct middorsal stripe. The white of the underparts reaches to the lower border of the eyes and ears, and the tail is white to pale grayish brown with no dorsal stripe.

The Perdido Key beach mouse currently survives on the western part of Perdido Key including the Gulf State Park, Baldwin County, Alabama; and until the passage of Hurricane Frederick in September 1979, survived on the eastern part of the key at the Gulf Islands National Seashore, Escambia County, Florida. The mouse has been reestablished on the Gulf Island National Seashore. The species is presumed to have once inhabited the entire key. The Perdido Key State Preserve is located in the central part of Perdido Key. Beach mouse habitat exists in the Preserve, although it is less than optimum in terms of average dune height.

The habitat is restricted to the mature coastal barrier sand dunes along the Gulf. The depth of the habitat extending inland may vary depending on the configuration of the sand dune system and the vegetation present. There are commonly several rows of dunes paralleling the shoreline and within these rows there are generally three types of microhabitat. The frontal dunes are sparsely vegetated with sea oats, bunch grass, beach morning glory and railroad vine. The interdunal areas contain sedges, rushes and salt-grass. The dunes farther inland from the Gulf support growths of slash pine, sand pine, scrubby shrubs and oaks.

The Perdido Key beach mouse is seminomadic over a relatively small range, digging as many as 20 burrows into the dunes for nesting, food storage and refuge from predators. Burrows are dug mainly on the lee side of the primary dunes and in other secondary and interior dunes where the vegetation provides suitable cover. The mice may also use ghost crab burrows.

This species is nocturnal, feeding primarily on the seeds of sea oats and beach grass. When these seeds are scarce, especially in the late winter or early spring, beach mice may consume invertebrates or fruiting bodies of sea rocket.

Reproduction may occur throughout the year, but likely it peaks during November, December, and January. Beach mice litters range from two to seven, and the young may reach sexual maturity by 6 weeks of age. Studies show that female beach mice are capable of producing litters every 26 days, and they may produce 80 or more young in their lifetimes. Beach mouse life spans are short, ranging from less than 5 months in the wild to over 3 years.

SPECIES STATUS AND TRENDS: Loss of habitat is considered to be the primary factor for the mouse's decline. It is estimated that approximately 34 percent of the island has been developed and is no longer suitable habitat. Commercial and residential development, especially if the latter is high density multiple housing, isolates small areas of beach mouse habitat thereby fragmenting

populations and upsetting gene flow. Such barriers also prevent recolonization of an area should a population segment be extirpated.

Tropical storms periodically devastate Gulf Coast sand dune communities, dramatically altering or destroying habitat, and either drowning beach mice or forcing them to concentrate on high scrub dunes where they are exposed to predators. The Gulf State Park area was severely flooded by Hurricane Frederick on September 13, 1979. Washovers completely destroyed mouse habitat on all dunes less than 11.5 feet high, leaving only the dune ridges in excess of this height as habitat. At the eastern end of the Key in Gulf Islands National Seashore, 80 percent of the area was overwashed during the hurricane.

Associated with residential and commercial development are house mice and feral cats. Feral house cats may prey on beach mice, and house mice can compete with beach mice for food and cover.

Trapping at Gulf State Park in 1983 yielded 13 beach mice at a relative density of 3.3 mice per 100 trap-nights. Trapping conducted in Perdido Key State Preserve and Gulf Islands National Seashore did not produce any mice. An earlier study conducted prior to Hurricane Frederick indicated a total population of approximately 26 beach mice at Gulf State Park (relative density of 3.3 mice/100 trap-nights), and 52 mice at the Gulf Islands National Seashore.

PESTICIDE/SPECIES INTERFACE: The Perdido Key beach mouse may be affected by pesticides used to control rodents such as house mice and black rats. Toxic baits placed in or adjacent to beach mouse habitat would be a potential threat to the species.

POINT ARENA MOUNTAIN BEAVER (Aplodontia rufa nigra) - E

SPECIES INFORMATION: The endangered Point Arena mountain beaver lives on the Mendocino coast in the Point Arena area, California. They feed upon succulent herbaceous plant material, deciduous tree bark and leaves that form vegetative understories (sword fern, cow parsnip, salal, nettle, salmonberry and lupine). Point Arena mountain beavers live 6+ years becoming mature during their second year. They mate during a 5-7 week period in mid to late winter. The females have one litter per year consisting of 2-3 (rarely 4) pups which are born in late February and March after a 28-30 day gestation period.

Point Arena mountain beavers are restricted in geographic distribution to cool, moist areas receiving heavy rainfall (25-60 inches per year). Within this geographic distribution populations are found in four basic habitat types: coastal scrub; coniferous forest; riparian; and stabilized dunes.

SPECIES STATUS AND TRENDS: Fewer than 100 individuals are estimated to exist in the ten known populations of Point Arena mountain beavers. Four populations live on Manchester State Beach (privately owned [AT&T site]). The other populations occur on Minor Road (privately owned), Lagoon Lake (private), Point Arena (privately and state owned), Alder Creek (private & state), Irish Gulch (private & state) and Mallo Creek (private and state).

PESTICIDE/SPECIES INTERFACE: The Point Arena mountain beaver could be adversely impacted due to the registered use of vertebrate control agents within or adjacent to occupied habitat of this species.

SALT MARSH HARVEST MOUSE (Reithrodontomys raviventris) - E

SPECIES INFORMATION: The Salt marsh harvest mouse is found in pickleweed dominated tidal and non-tidal wetlands of the San Francisco Bay estuary in Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, and San Mateo counties.

SPECIES STATUS AND TRENDS: The northern subspecies, *R. r. halicoetes*, occurs north of Point San Pedro (Marin) and Point Pinole (Contra Costa) in tidal and non-tidal wetlands bordering San Pablo Bay, the Petaluma and Napa Rivers, and Suisun Bay east to Collinsville and Antioch. The southern subspecies, *R. r. raviventris*, occurs in tidal and non-tidal wetlands from Points Pinole and San Pedro south to the Alviso district. Both subspecies have been adversely affected by loss of habitat associated with diking, filling, and conversion of their habitat for agricultural use, salt production, urbanization, and mosquito control. This loss has been particularly acute in the South San Francisco Bay area.

PESTICIDE/SPECIES INTERFACE: This mouse could be adversely impacted due to the registered use of vertebrate control agents within or adjacent to occupied habitat of this species.

SAN JOAQUIN KIT FOX (Vulpes macrotis mutica) - E

SPECIES INFORMATION: The San Joaquin kit fox is a small canid that weighs approximately 5 pounds. Foraging for a variety of rodents and lagomorphs typically occurs at night, although animals have been observed stalking California ground squirrels (Spermophilus beecheyi) during daylight hours, and pups may be observed during the day at den sites. Dens are usually constructed on gentle slopes or level areas. As few as one or as many as 32 or more entrances may be excavated at each site. Kit fox will also opportunistically utilize man-made structures such as culverts or pipes, or may enlarge abandoned ground squirrel burrows as denning sites.

Females produce 1 litter per year, averaging 4 pups. The pups are born in February through early May. Both males and females sexually mature in their second year. The San Joaquin kit fox home range is estimated at 1 to 2 square miles. Considerable overlap between individual home ranges is believed to occur.

SPECIES STATUS AND TRENDS: This species was historically distributed within an 8,700 square mile area in central California, extending in the north from the vicinity of Tracy in the San Joaquin Valley, south to the general vicinity of Bakersfield. Kit fox are currently limited to remaining grassland, saltbush, open woodland, and alkaline sink valley floor habitats, and similar habitats located along western bordering foothills and adjacent valleys and plains. However, some agricultural areas such as range land, irrigated pastures, and citrus orchards, may support these animals. Intensive agriculture, oil and gas development, urbanization, and other land-modifying actions have eliminated its habitat over extensive portions of this area.

PESTICIDE/SPECIES INTERFACE: This species could be adversely impacted due to the registered use of vertebrate control agents and insecticides within or adjacent to occupied habitat

of this fox. The species could be impacted through direct exposure (i.e., dermal contact, inhalation of sprays or mists, and ingestion of contaminated baits) or secondary poisoning from feeding on contaminated food items.

SILVER RICE RAT (Oryzomys palustris natator (=Oryzomys argentatus) - E

SPECIES INFORMATION: The Silver rice rat is of generalized rat-like appearance with a slender skull, coarse fur, colored silver-grey along its back, and having a sparsely haired tail. This species inhabits wetlands, utilizing salt rather than freshwater marsh; its habitats include intermittently flooded high marsh vegetated with sea oxeye and buttonwood, saltmarsh flats covered with low grassy vegetation, and low intertidal areas supporting mangroves. The silver rice rat maintains large home ranges, about 50 acres, and occur at low densities. The rat feeds on seeds, plant parts, and animal foods such as arthropods. This small mammal is restricted to the Lower Keys of Monroe County, Florida.

SPECIES STATUS AND TRENDS: The silver rice rat is known to occur on eight keys, generally at low population levels. These rats are found on Big Torch, Johnston, Middle Torch, Raccoon, Saddlebunch, Little Pine, Summerland, and Water Keys. Although no population numbers are available, surveys have provided capture rates that have varied from a 0.48 percent trap-night capture rate to a 9.5 percent capture rate. Much silver rice rat habitat has been lost because of commercial and residential development. This species has recently been extirpated from Cudjoe Key. It is believed that the species recently occurred on Big Pine and Boca Chica Keys, where suitable habitat still exists but where biologists have been unable to trap rice rats. Predation by raccoons, and competion with the black rat for food and living space may have contributed to the disappearance of the silver rice rat from Cudjoe, Big Pine, and Boca Chica Keys. Further habitat fragmentation, due to development, could reach a point where genetic variability is no longer sufficient to assure long-term survival of the species.

PESTICIDE/SPECIES INTERFACE: The silver rice rat could be exposed to pesticides that are used for the control of rodents and mosquitos. Poison baits broadcast in or adjacent to the silver rice rat's habitat would pose a threat to the species.

SOUTHEASTERN BEACH MOUSE (Peromyscus polionotus niveiventris) - T

subspecies of the oldfield mouse (*Peromyscus polionotus*). The oldfield mouse is a wide-ranging species in the Southeast. The Southeastern beach mouse is the largest beach mouse; it averages 139 millimeters in total length and 52 millimeters in tail length. Although it is darker and more buffy than the Anastasia Island beach mouse, it is still lighter than most inland subspecies of the oldfield mouse. Breeding activities may be similar to those of beach mice on the Gulf Coast. The breeding season for beach mice appears to start in November and end in early January. The female, which may reach reproductive maturity at 6 weeks of age, produces two to seven beach mice per litter. A female beach mouse can usually produce liters at 20-day intervals, but mortality is high. Most of the progeny will not survive over 4 months.

Predictably, beach mice feed on sea oats and beach grasses. The sea oats must be blown to the ground for the mice to eat. During the spring and early summer when seeds are scarce, beach mice may eat invertebrates.

The Southeastern beach mouse inhabits sand dunes which are vegetated by sea oats and dune panic grass. The scrub adjoining these dunes is populated by oaks and sand pine or palmetto. A study conducted on Merrit Island indicated that the Southeastern beach mouse may prefer open sand habitat with clumps of palmetto and sea grapes, or dense scrub habitat dominated by palmetto, sea grape, and wax myrtle; over seaward habitat with sea oats. Little specific information exists about this species' burrowing habits, although they are presumed to be similar to those of beach mice on the Gulf Coast. Sometimes beach mice use the former burrows of ghost crabs, but usually they dig their own. Burrow entrances are generally found on the sloping side of a dune at the base of a clump of grass. The burrows are used for nesting and food storage as well as a refuge.

SPECIES STATUS AND TRENDS: The Southeastern beach mouse is primarily threatened by beach and residential development which has eliminated suitable habitat. Predators such as raccoons, skunks, snakes, great-blue herons, dogs, and cats pursue the species. Competitors, such as house mice, are also threats. The control of free-ranging housecats has been identified as important to the species' survival.

The historic range of the threatened Southeastern beach mouse was north Florida's Mosquito (Ponce) Inlet in Volusia County to south Florida's Hollywood Beach in Broward County. Now, the Southeastern beach mouse has apparently been eliminated from the southern section of its habitat at Jupiter Island, Palm Beach, Lake Worth, Hillsboro Inlet, and Hollywood Beach. Beach mice also may be gone from the East Peninsula. Humphrey (1987) sighted only a few small, fragmented populations between Sebastian Inlet to Hutchinson Island. The healthiest populations appear to occur on public lands: Cape Canaveral National Seashore; Merritt Island National Wildlife Refuge; Cape Kennedy Air Force Station; the southern half of Sebestian Inlet State Recreation Area, and Pepper Park. Most of the remaining habitat for the species is on public land, and management efforts have centered around the control of house mice. Facilities for the public have been located inland of the dune grassland. This includes campgrounds, park concessions, refuse dumpsters, or anywhere else where house mice could survive.

PESTICIDE/SPECIES INTERFACE: The Southeastern beach mouse may be affected by pesticides used to control rodents such as house mice and black rats. Toxic baits placed in or adjacent to beach mouse habitat would be a potential threat to the species.

STEPHEN'S KANGAROO RAT (Dipodomys stephensi) - E

SPECIES INFORMATION: The Stephen's kangaroo rat is a small rodent about 40-80 grams, mean of approximately 65 g (based on > 500 animals). The range is endemic to select portions of western Riverside County, a part of northern San Diego County, and extreme southwestern San Bernardino County. Federal land includes Camp Pendleton, Naval Weapons Station (Fallbrook Annex), March Air Force Base. The habitat includes annual grasslands with low forb and sparse perennial cover (early successional habitat) due to fire, agriculture, and/or grazing. The food of this species includes forbs, seeds, and insects. The reproductive habits are multiple litters/year throughout the seasons. It is a desert-adapted species that does not require free water for survival.

SPECIES STATUS AND TRENDS: The exact number of this population are not known. The reasons for decline include habitat loss and fragmentation due to urbanization and industrial

development. Occupied and potential habitat are mostly all in private hands. The loss of many movement corridors between existing populations is likely. Many instances of illegal "take" of animals and habitat have been documented by Service biologists. The non-federal impacts of the species include an interim HCP in place.

PESTICIDE/SPECIES INTERFACE: Species may invade open agricultural fields, and adjacent habitat is also at risk to drift of herbicides and pesticides. This species is susceptible to rodenticides used for *Spermophilus* control.

TIPTON KANGAROO RAT (Dipodomys nitratoides nitratoides), FRESNO KANGAROO RAT (Dipodomys nitratoides exilis), GIANT KANGAROO RAT (Dipodomys ingens)

SPECIES INFORMATION: The Tipton kangaroo rat, Fresno kangaroo rat, and the Giant kangaroo rat, as with other members of this rodent genus, are highly adapted for bipedal locomotion and survival in arid environments. They typically are active at night.

They are all found in the San Joaquin Valley in central California. They all typically feed on seeds forbes including red stem filaree, arabian grass, and pepper grass. They also forage on the parts of these plants during the growing season. The San Joaquin Valley kangaroo rats produce one to two litters per year, between January and June. Fresno and Tipton kangaroo rats probably have an average of 2 young per litter. The giant kangaroo rat has between 4-6 young per litter. These species are not long lived in the wild. Williams estimated that the Tipton kangaroo rat only produce between one and two litters in its life time.

The Tipton kangaroo rat weighs about 37 grams. It does not exhibit hording behavior to the extent that giant kangaroo rats do. This species forages year round and consumes about 3 to 4 grams per day. Their home range is an estimated 0.4 - 0.8 acres (1-2 hectares).

The Fresno kangaroo rat weighs about 34 grams. It feeding habitats are similar to the Tipton kangaroo rat. The home range is estimated to be about 2.5 to 5 acres.

The giant kangaroo rat is the heaviest of all kangaroo rats, with a weight of about 130 grams. They ingest between 5 to 10 grams per day. They also forage, collecting and storing food in their burrow systems. They later feed on this supply when food availability is low. The home range of the giant kangaroo rat is estimated at 0.30 acres.

SPECIES STATUS AND TRENDS: The Tipton kangaroo rat was historically limited to the Tulare Basin portion of the San Joaquin Valley, extending from Lemoore and Hanford (Kings County) in the north; southeast along State Route 99 from Tipton to Pixley (Tulare County), Delano, Bakersfield, and Arvin (Kern County); westward to the southern, eastern, and north shores of the former Buena Vista Lake (Kern County); and then northward along the Antelope Plain from Buttonwillow to Lost Hills (Kern County) to Kettleman City (Kings County), north to Westhaven (Fresno County). The current distribution consists of approximately 63,000 acres of alkaline sink habitats widely dispersed within areas of intensive agricultural production.

The original geographic range of the Fresno kangaroo rat extended from north-central Merced central Fresno Counties. Approximately 10,000 acres of alkali sink habitats favored by this

subspecies are currently extant, principally in scattered parcels varying in size from less than 100 to over 1,000 acres.

The original distribution of the giant kangaroo rat extended from southern Merced County, through the San Joaquin Valley, to southwestern Kern County and northern Santa Barbara County. Preferred habitat is native annual grassland with sparse vegetation, good drainage, fine loamy soils, and a slope of less than 10 percent. Significant populations survive in only a few areas within remaining habitat, including the Panoche Hills, Cuyama Valley, and Carrizo and Elkhorn Plains. All three species have been adversely affected by the conversion of their habitat to agricultural and urban use.

PESTICIDE/SPECIES INTERFACE: These species could be adversely impacted due to the registered use of vertebrate control agents and insecticides within or adjacent to occupied habitat of these kangaroo rats. These kangaroo rats could be impacted through direct exposure (i.e., dermal contact, inhalation of sprays or mists, and ingestion of contaminated food items).

UTAH PRAIRIE DOG (Cynomys parvidens) - T

SPECIES INFORMATION: The Utah prairie dog is a burrowing rodent in the squirrel family. This species is confined to disjunct areas in southwest Utah including Beaver, Garfield, Iron, Kane, Sevier, Washington, and Wayne Counties. There is a positive correlation between available moisture and prairie dog abundance and density. Prairie dogs appear to prefer swale type formations where moist herbage is available even during drought periods. A well-drained area is necessary for home burrows. Prairie dogs must be able to inhabit a burrow system approximately 3.3 feet underground without becoming wet. The vegetative height within the colony must be low enough to allow standing prairie dogs to scan their environment for predators.

Prairie dogs are predominantly herbivores. Grasses are preferred food items during all seasons. The flowers and seeds of forbs also are preferred. Although forbs other than alfalfa are not always highly preferred items, they may be critical to a prairie dog town's survival during drought. Cicada insects are a preferred animal food item and are readily taken when available. In colonies at low elevations where moist herbage is available, breeding occurs in the early spring and lactation continues into June. Females are capable of giving birth annually to litters that average three to four young usually born in April.

SPECIES STATUS AND TRENDS: The Utah prairie dog population was estimated to be about 95,000 in the 1920's, declining to a 1976 spring count of 2,160 adult animals. Overall numbers have increased during the period 1976-1989 with the 1989 spring count of 7,377. The summer of 1989 population was estimated at approximately 33,700 animals. In 1990, Utah prairie dog numbers on public lands (two-thirds of the total population in 1989) declined 61 percent.

The decline of the Utah prairie dog was caused by human-related habitat alteration and by posioning, which resulted from the belief that prairie dogs compete with domestic livestock for forage. At present, the Utah prairie dog is still threatened by loss of habitat over much of its range. In addition, the damage caused by local concentrations of prairie dogs has provoked farmers in some areas to kill them illegally to protect crops and cropland.

PESTICIDE/SPECIES INTERFACE: Registered species uses that may occur in the vicinity of Utah prairie dog habitat include, but are not limited to, rangeland, pastures, noncrop land, rights-of-way, alfalfa, barley, oats, clover, and control of prairie dogs, ground squirrels, pocket gophers, and other mammals. Pesticides that are toxic to mammals would have an adverse impact to the Utah prairie dog.

BIRDS

ATTWATER'S GREATER PRAIRIE-CHICKEN (Tympanuchus cupido attwateri) - E

SPECIES INFORMATION: Attwater's greater prairie-chicken is a brown, hen-like bird, 17 to 18 inches (43 to 45.7 cm) in length. Its feathers are heavily barred, and it has a short, rounded, dark tail. The males have orange neck sacs and black pinnae that are used in courtship. Prairiechickens are mainly herbivorous, preferring forbs and agricultural crop seeds, but they will also consume insects. Breeding takes place on flat, broad areas with little cover, called leks or booming grounds. These can be natural or artificial. For example, the prairie-chicken has been observed using runways and roads as breeding areas. The males gather at the leks in the spring and attract the females by strutting and calling. Leks are used year after year. Breeding starts in late February and continues until early May. Nests, usually a shallow depression lined with dead leaves and grasses, are built near leks, in medium to tall grasses. Clutch size ranges from 5 to 15 eggs. Pheasants often disrupt breeding activities and will occasionally lay their eggs in prairiechicken nests. Prairie-chickens prefer diversified coastal prairie grassland, where short, mid-size and tall grasses are evident. These grasslands can be maintained by moderate cattle grazing and prescribed burning. Vegetation preferred by the prairie-chicken includes tall dropseed (Sporobolus asper), little bluestem (Schizachyrium scoparium), and ragweed (Ambrosia psilostachya). The historic range of the species once extended from the Nueces River in Texas to Abbeyville, Louisiana. Today, however, the species is found in only a fraction of its former range. Texas has two national wildlife refuges with Attwater's greater prairie-chicken management areasthe Attwater's Prairie Chicken National Wildlife Refuge and the Tatton Unit of the Aransas National Wildlife Refuge. The U.S. Fish and Wildlife Service's "Counties of Occurrence" list includes Austin, Fort Bend, Galveston, and Refugio Counties, Texas.

SPECIES STATUS AND TRENDS: The greatest threat to this species is habitat loss. Maintenance of the coastal prairie is essential to the survival of the prairie-chicken. The goal of the recovery plan is to maintain viable, self-sustaining populations of Attwater's greater prairie-chickens to the point where the species may be downlisted to threatened and then eventually delisted. The tentative delisting goal is the year 2000. To accomplish the recovery objective, the plan advocates providing and protecting adequate habitat (19,000 additional hectares), protecting the species from predation and disruption (especially by pheasants and other exotic game birds), and implementing public education programs.

PESTICIDE/SPECIES INTERFACE: Because of the intensive agriculture surrounding this species habitat, exposure and possible adverse impacts are anticipated by using many of the subject chemicals.

AUDUBON'S CRESTED CARACARA (Polyborus plancus audubonii) - T

SPECIES INFORMATION: Audubon's crested caracara is about the size of an osprey, but with shorter wings. It has a length of about 21 to 23 inches, and a wingspread of about 48 inches. The caracara has long, yellow legs and a massive bluish bill. Sexes are similarly plumaged; younger birds are browner than adults. The caracara is an opportunistic feeder; its diet includes both carrion and living prey. The living prey are usually small turtles and turtle eggs. In addition

to these items, caracaras prey on insects, fish, frogs, lizards, snakes, birds, and small mammals. A pair will sometimes join forces to subdue a larger animal such as a rabbit or egret.

The crested caracara is a bird of open country. Dry prairies with wetter areas and scattered cabbage palm comprise typical habitat. Caracaras also occur in some improved pasture lands and even in lightly wooded areas with more limited stretches of open grassland. Adult caracaras maintain large territories, usually with their mates. Pair bonds are strong, persisting until one of the mates dies. As the breeding season approaches, the pair begins to spend more time at the nest site. The nest site, a bulky structure of slender vines and sticks, is usually located in a cabbage palm. The breeding peak is from January to March, with the usual clutch being two or three eggs. Incubation lasts about 32 days, and the young leave the nest at about 8 weeks of age. The family group usually remains together for 2 to 3 months after the young fledge.

The region of greatest abundance for the Florida population is a five-county area north and west of Lake Okeechobee. Caracaras occur in the following Florida counties: Glades, DeSoto, Highlands, Okeechobee, and Osceola. Some of the birds might also occur in Charlotte, Hardee, and Polk Counties. Historically the Florida population was more widespread. The Florida population of Audubon's crested caracara is geographically isolated from other members of its subspecies. Other populations occur in northern Baja California, southwestern Arizona, southern Texas south to Panama, and also in Cuba and the Isle of Pines. The subspecies also occurs occasionally in southern New Mexico and southwestern Louisiana.

SPECIES STATUS AND TRENDS: At one time the crested caracara was a common resident in the prairie region of central Florida. The birds were sighted from northern Brevard County in the north, south to Fort Pierce, Lake Okeechobee, Rocky Lake (Hendry County), the Okaloosa Slough, and the Everglades (Collier County). Smaller numbers have been reported from as far north as Nassau County, and from as far south as the lower Florida Keys (Monroe County). At present the birds are rarely found north of Orlando or east of the St. John's River. Data gathered from 1973 to 1978 show the existence of about 150 active territories (300 adults) and about 100 immatures, giving a total population in Florida of between 400 and 500 individuals. Most caracaras occur on privately-owned lands in Florida. A few birds may wander east to Merritt Island, Cape Canaveral, and Patrick Air Force Base, or north to Ocala National Forest, but these would be transients. The only Federal land on which the bird might permanently reside is the Air Force's Avon Park bombing range in Polk and Highlands County. However, bombing range personnel informed the U.S. Fish and Wildlife Service that, although caracaras are occasionally seen in the area, none have nested there in recent years. Without any significant areas of habitat under State or Federal protection, long-term survival of the Florida population will depend largely upon finding innovative means of preserving the extensive tracts of prairie habitat in private ownership.

The primary cause for the decline of the crested caracara has been habitat loss. Real estate development, citrus groves, tree plantations, improved pastures, and other agricultural uses are all vying for the same habitat. Less significant factors may include: illegal killing and trapping; increased numbers of road kills due to a rising volume of traffic; slow recovery from population losses because of the caracara's low reproductive rate; and possible loss of genetic variability (due to the relatively small population), thus making the caracara more vulnerable to stresses than would otherwise be the case. The scarcity of the birds, combined with their scattered territories, makes it difficult to detect changes in numbers.

PESTICIDE/SPECIES INTERFACE: Exposure of the caracara to pesticides, rodenticides or other agricultural use chemicals would occur primarily through ingestion of contaminated prey or carrion. Pesticides, avicides, and rodenticides that have potential for being lethal to birds would pose a threat to the caracara if the bird were to be exposed to the toxic agent.

CALIFORNIA CONDOR (Gymnogyps californianus) - E

SPECIES INFORMATION: This large, formerly widespread vulture has an historic range that includes the California Coastal Ranges, Central Transverse Range, Southern Sierra Nevada mountains, to Arizona, New Mexico, and Texas. California condor habitat includes rocky cliffs and trees for roosting, open grasslands and oak woodlands for foraging. Reproduction occurs at 6 years of age, with a low reproductive rate. A nesting pair only raises one chick/year and 6 months is required for young to fledge.

SPECIES STATUS AND TRENDS: Only 52 birds remain including 50 in captivity at the San Diego and Los Angeles Zoos, and 2 released into wild. Decline of the species has occurred as a result of shooting, lead poisoning, secondary poisoning from coyote control, loss of foraging areas due to suburbanization, and agricultural development. Limited release of captive birds was initiated in October 1991 by the Service. Along with successful captive breeding, the number of birds may increase in the wild.

PESTICIDE/SPECIES INTERFACE: This species could be adversely affected due to the applications of avicides and secondary poisoning is possible from carrion killed by rodenticides that have persistent effects.

HAWAIIAN COOT (Fulica americana alai) - E

SPECIES INFORMATION: The Hawaiian coot is a subspecies of the common American coot but is smaller and has a white frontal shield distinctly larger than the mainland form. This waterbird occurred historically on all the major Hawaiian islands except Lanai and Kahoolawe. Currently, it is most numerous on Oahu, Maui and Kauai. It's habitat includes thickly vegetated marshland with associated open water. The coot feeds on seeds or invertebrates near the surface of the water or by diving or foraging in mud or sand. They nest on scattered open fresh and brackish water ponds or reservoirs, on irrigation ditches, and on small openings of marsh vegetation. Nesting occurs mostly from March through September, although some nesting apparently occurs during all months of the year.

SPECIES STATUS AND TRENDS: The loss of wetland habitat is the primary cause of the decline of the Hawaiian coot. Other threats include the encroachment of introduced plants, the introduction of exotic mammalian predators, and sudden or major changes in water levels. Further expansion of housing and other urban development in and around wetland areas will continue to threaten the survival of the Hawaiian coot. Annual statewide censuses from 1968 through January 1983 averaged 996 individuals for all habitats surveyed. Populations increased in the late 1970's with population counts ranging between 422 and 2.330 birds.

PESTICIDE/SPECIES INTERFACE: Pesticide runoff into streams and ponds in the Hawaiian Coot habitat is a threat to the coot's survival. This species could also be adversely impacted from

vertebrate control agents when applied in the form of granules, pellets, or grain baits; or from the applications of avicides.

HAWAIIAN CROW (Corvus hawaiiensis) - E

SPECIES INFORMATION: The Hawaiian crow is a large black-brown passerine. It ranges exclusively on the island of Hawaii. Historically, the crow occurred in lower forests and parklands. Currently, it exists in a single population along the coastal slope of Mauna Loa. It's habitat includes parkland forests consisting primarily of ohia and koa with an understory or mixture of native trees and shrubs. The crow feeds on the fruits of trees and shrubs, mice, small lizards, nestlings of small passerine birds and nectar from flowers. Breeding pairs nest usually in the same tree or vicinity in succeeding years. The crow's breeding season starts from March and extends into July.

SPECIES STATUS AND TRENDS: One cause of the crow's decline is the destruction of it's habitat. This includes the clearing of forest areas, browsing and grazing by cattle, horses, goats, and sheep. Other threats include avian diseases and parasites, introduced rats, mongoose, feral cats and dogs, and hunting.

The total estimated population of the Hawaiian Crow in 1990 is approximately 12 birds in the wild and 10 held in captivity. The crow is critically endangered. Unless recovery action can be effectively implemented, the species may soon become extinct.

PESTICIDE/SPECIES INTERFACE: Pesticides sprayed in pasture land could threaten the Hawaiian Crow. This species could also be adversely impacted from some vertebrate control agents when applied in the form of granules, pellets, or grain baits; or from the applications of avicides. The crow is also susceptible to secondary poisoning from eating contaminated prey items.

HAWAIIAN DUCK (Anas wyvilliana) - E

SPECIES INFORMATION: The Hawaiian duck is a close relative of the mallard. The Duck is historically found on all the main Hawaiian Islands except Lanai and Kahoolawe. It is currently found on Kauai, Oahu, and the Island of Hawaii. It's habitat includes freshwater marshlands, flooded grasslands, coastal ponds, streams, mountain pools, mountain bogs, and forest swamplands. The duck feeds on various types of snails, dragonfly larvae, earthworms, grass seeds, rice, green algae, and seeds and leaf parts of other wetland plants. The duck nests on the ground near water. Breeding occurs year-round with a peak from December to May.

SPECIES STATUS AND TRENDS: The primary causes of the decline of the Hawaiian Duck include loss of wetland habitat due to change in agricultural practices, predators, and hunting. In addition, genetic "pollution" by feral Mallards is swamping the gene pool of the Hawaiian Ducks. The last estimated population of the ducks on Kauai is 3,000 in the mid-60's. There was an estimated 53 birds on Oahu in 1983.

PESTICIDE/SPECIES INTERFACE: Pesticide runoff into streams and ponds threaten the Hawaiian Duck. This species could also be adversely impacted from some vertebrate control

agents or insecticides when applied in the form of granules, pellets, or grain baits; or from the applications of avicides.

HAWAIIAN HAWK (Buteo solitarius) - E

SPECIES INFORMATION: The Hawaiian hawk is a small, broad-winged buteo endemic to the Hawaiian Islands. Currently, the hawk is widely distributed on the island of Hawaii and is known to breed only there. There were also rare historical observations on the islands of Kauai, Oahu, and Maui. The hawk is found in both open or parkland forests and dense rain forests. They are also frequently seen in agricultural areas, such as papaya and macadamia nut orchards, and adjacent to sugarcane fields. Hawks nest in a wide variety of habitats, ranging from lowland agricultural areas and exotic forests to upper elevation pasturelands and native rain forests. Nesting occurs from March through September. The hawks diet primarily consists of rats, mice, and a wide assortment of both native and introduced bird species.

SPECIES STATUS AND TRENDS: The primary cause of the hawk's decline is the harassment of nesting birds and shooting. Harassment of breeding birds can result in nest abandonment. Disturbance of nests can also cause young to leave the nest prior to normal fledging. Habitat destruction is also a major threat to the hawks. Hawaii's forests have been drastically reduced as the result of cutting for firewood, timber, croplands, and pasture. In 1984, the total hawk population was estimated to be between 1,400 and 2,500 on the island of Hawaii.

PESTICIDE/SPECIES INTERFACE: There may be secondary poisoning by feeding on rats, mongoose, birds, or other prey that has been targeted for poisoning. This species could also be adversely impacted from the applications of avicides.

MARIANA CROW (Corvus kubaryi) - E

SPECIES INFORMATION: The Mariana crow is the only corvid in Micronesia and is the only native Guam forest bird with populations still existing in the wild. It is a small, black crow that was formerly common on Guam and Rota, where it was confined to forested areas and coconut plantations. Presently, crows on Guam are found in forest areas from Ritidian Point to Anao along the northern cliffline, in Northwest Field, and in the Convention Weapons Storage Areas. They are no longer found in south and central Guam, but are still fairly common on Rota. The crow is generally restricted to mature, native forest and is absent from areas of human habitation. It is an omnivorous, opportunistic feeder that is known to feed on insects, lizards, hermit crabs, fruits, seeds, flowers, and, according to Jenkins (1983), occasionally foliage and bark. The crow forages on the ground as well as in the forest canopy and may also feed on other birds' eggs. Little is known about the crow's reproductive biology, but it apparently nests year-round with clutch sizes ranging between one and two eggs.

SPECIES STATUS AND TRENDS: The primary cause of the decline of the Mariana crow is predation by the introduced brown tree snake on Guam. Other possible causes of its decline are habitat degradation due to increasing development on both Guam and Rota, typhoons, competition from introduced avian species, pesticides, hunting and avian disease. The last sightings of the crow in the south of Guam occurred in the mid-1960's, and they have been absent from central Guam since the mid-1970's. A USFWS survey in 1981 estimated a population of 357 crows, distributed primarily over the northern cliffline forests. In 1985, it was estimated that there

were less than 100 crows left on Guam. The total population on Rota, where there is no predation by the brown tree snake, was estimated to be 1,318 birds in 1982.

PESTICIDE/SPECIES INTERFACE: Pesticides have been used extensively in the past for agriculture and vector control on Guam. Following World War II and up until 1970, DDT and other insecticides were applied as often as once a week by the military. Pesticides sprayed in pasture land could threaten the Mariana Crow. This species could also be adversely impacted from some vertebrate control agents when applied in the form of granules, pellets, or grain baits; or from the applications of avicides. The crow is also susceptible to secondary poisoning from eating contaminated prey items.

MISSISSIPPI SANDHILL CRANE (Grus canadensis pulla) - E

SPECIES INFORMATION: Mississippi sandhill cranes resemble great blue herons (Ardea herodias). A major distinguishing characteristic is that cranes are completely gray. Great blue herons usually have white on their heads and dark colored underparts. When standing erect, cranes are about 4 feet tall. Male and female cranes are similar in appearance. All cranes have long necks, and adult cranes possess a bald red forehead. The species vocalizations are loud and clattering Cranes are also unique in that they require separate nesting, foraging, and roosting habitats.

Most Mississippi sandhill cranes survive on the Mississippi Sandhill Crane National Wildlife Refuge in Jackson County, Mississippi. This bird's present range is restricted to the Pascagoula River (east), to the Jackson County line (west), to about Simmons Bayou (south), to 4 miles north of the town of Vancleave (north). Savannas are the preferred habitat of the Mississippi sandhill Crane and are inhabited year round. These wet grasslands are predominated by wiregrass (Aristida spp.) with scattered longleaf pine (Pinus palustris), slash pine (P. elliottii), and cypress (Taxodium ascendens) trees. Other associated plants include pitcher plants (Sarracenia spp.), sundew (Drosera spp), clubmoss (Lycopodium alopecuroides), and pipeworts (Eriocaulon spp.). Cranes also utilize wooded depressions (swamps or ponds) dominated by cypress, longleaf, and slash pine trees with an understory of swamp cyrilla (Cyrilla racemiflora), buckwheat tree (Cliftonia monophylla), wax myrtle (Myrica cerifera), and several species of holly (Ilex spp.).

Crane feeding habits vary with the seasons. In the summer, the birds feed upon the natural foods found in swamps, savannas, and open forests. These include adult and larval insects, earthworms, crayfish, small reptiles, frogs and other amphibians, and possibly small birds and mammals. Cranes also consume roots, tubers, nuts, seeds, fruits, and leaves. During the other three seasons, the birds eat small corn and chufa, an introduced plant. In the early fall, cranes usually feed on corn until the kernels become scarce. Chufa is used year round. Pecans are often eaten from September through December.

Although some nesting occurs in forested areas, most takes place in open savannas and swamp openings. These areas vary from dry to being covered in shallow water. Nests are constructed on the ground of vegetation gathered in the immediate vicinity. Paired cranes select a breeding territory for courtship, mating, and nesting, and may defend it from other cranes. Territory size probably depends on the quality and type of the habitat, the age of the paired cranes, and the population density of other cranes. Only one pair of birds has been observed to nest during a season in each open savanna; but, where clearings are separated by forested areas, cranes have

nested within one-half mile of each other. Nesting territories are generally used for more than 1 year, some for 10 to 17 years. Cranes also tend to reuse nests for up to 3 consecutive years. When new nests are constructed, they are often located close to the previous nests.

The age of sexual maturity for the Mississippi sandhill is thought to be 3 or 4 years of age. Females become active a year or so later than males. Data is available showing that Mississippi sandhill cranes first lay eggs between the ages of 3 to 6 years. Frequently, these cranes will raise only one chick a year. Hatching begins in April, peaks during the first 3 weeks of May, and ends by mid-August. An August hatching may be the result of renesting. Data through 1988 indicates that 73 of a total 142 wild eggs have hatched or 51 percent. However, since 1982, hatching success has apparently declined. Information was compiled for 70 eggs that failed to hatch. Most of the eggs, a total of 43, failed because of infertility or other unknown causes. Only 11 subadult Mississippi sandhill cranes have been spotted during the winter since 1980. This supports the theory that the species productivity has been low.

SPECIES STATUS AND TRENDS: With population estimates of less than 100 birds since 1929, the Mississippi Sandhill Crane's status has always been precarious. During the 1950's thousands of acres of the crane's favored savanna habitat were drained and converted to slash pine plantations. Dense understories developed underneath the mature pine trees, and the once open, undisturbed habitat became unsuitable for cranes. Commercial and residential development also progressed, and the human population increased. Eight paved highways now transect or border the crane's range. These roads have further depleted habitat, caused pollution problems, and eased public access to the cranes. Sporadic crane shootings were reported in the 1960's and 1970's. In addition, roadsides are usually sprayed with herbicides or other pollutants. Until recently, fire ants were eliminated with Mirex. A dead crane was discovered in 1974 with Mirex residues in the breast muscle and brain.

Eighteen of the cranes necropsied by the Patuxent Wildlife Research Center since 1981 have had tumors. Suspected causes have been infectious viruses or parasites, naturally occurring toxins, and genetic predisposition. The crane's susceptibility to tumors may have resulted from a decrease in genetic variability. Low genetic variability may also be responsible for a decrease in hatching success, and for deformities in the captive population. Natural causes, such as flash floods, hurricanes, and droughts, have also caused some deaths.

Most of the current crane population and its habitat is protected on the 19,273-acre Mississippi Sandhill Crane National Wildlife Refuge. The Grand Bay National Wildlife Refuge has been acquired southeast of the original refuge, and a second population of cranes may be introduced there if more land can be obtained.

A captive population was established at the Patuxent Wildlife Research Center in Laurel, Maryland. Developed with wild Mississippi sandhill crane eggs, the captive population numbered 32 adults in 1989. Captive releases to the Mississippi Sandhill Crane Refuge began in 1981, and by 1983 there were 13 free-flying captive-raised cranes on the refuge. A total of 96 captive-raised cranes had been released by 1989, and 53 of these had survived. By 1990, eight captive-raised cranes had attempted to nest.

PESTICIDE/SPECIES INTERFACE: Any pesticide, including rodenticides, that are known to be toxic to birds would be a serious threat to the Mississippi sandhill crane if applied when the cranes forage off Refuge land in adjacent crop fields (e.g. corn, grains, pasture, pecans).

NENE (HAWAIIAN GOOSE) (Nesochen sandvicensis) - E

SPECIES INFORMATION: The Nene (Hawaiian goose) is a medium-sized goose historically found on the islands of Hawaii and Kauai. It is currently found on the islands of Hawaii, Maui, and Kauai. It's habitat includes rugged lava flows in vast areas of upland scrub growth during nesting season and pasture land during their non-breeding season. The Hawaiian goose feeds primarily on green vegetation and small berries. Nesting often occurs on an island of vegetation surrounded by lava during the period of October through February. The same nest site is usually occupied in successive years.

SPECIES STATUS AND TRENDS: The primary causes of the Nene's decline are hunting and disturbance by humans, introduced predators, competition from introduced birds, effects of introduced plants on their habitat, modification of habitat, and low productivity of existing birds. Current estimated population include 300 birds on Hawaii and 100-150 birds on Maui. The populations appear stable. They may possibly increase if the Nene become reestablished in lowland pasture.

PESTICIDE/SPECIES INTERFACE: Pesticide sprayed in areas where the Nene feed or nest, such as golf courses, pastures, and ranchland, will threaten the Hawaiian goose. This species could also be adversely impacted from some vertebrate control agents or insecticides when applied in the form of granules, pellets, or grain baits; or from the applications of avicides.

PUERTO RICAN PLAIN PIGEON (Columba inornata wetmore) - E

SPECIES INFORMATION: The Puerto Rican plain pigeon is a large pigeon about the size and shape of a domestic pigeon. At a distance the species appears pale blue-gray. The head, hindneck, breast, and the top central part of the folded wing are washed with vinaceous. The wing coverts are margined with white. Legs and feet are dark red. A variety of fruits and seeds, and livestock feed provide nourishment for this species. Approximately 70 percent of the foods come from tree branches, and 30 percent from the ground. Principal foods at Cidra are royal palm, mountain immortelle, West Indies trema and white prickle. Water is usually taken from the axils of bromeliads or from water-retaining blossoms of the African tulip-tree.

General habitat types used in the past include lowland swamps and woodland, open woodland and cultivated land in the mountains, limestone karst, and coffee plantations in upland hills. The presently occupied habitat is located in the lower montane rainforest zone. Breeding occurs throughout the year but peaks in late winter and spring. Some nests are flimsy platforms of twigs, occasionally placed on unused rat nests or on an accumulation of litter in a crotch or tangle of vines. More typically, nests are built on a bare forking tree branch or near the top of a bamboo stalk. The plain pigeon lays only one egg, but a female has been observed to produce three broods in a year. The minimum observed incubation period is 14 days. The mean fledging period at eight nests was 23 days. Chicks are dependent on the adults for several days after fledging. Because of the very close nest attendance typical of the species, it suffers few losses of eggs and young to predators. Apparently, flocking can occur at any time food is locally abundant. Adult

pigeons congregate in small flocks for feeding and drinking during the breeding season. Larger aggregations regularly form for roosting and feeding in the fall.

SPECIES STATUS AND TRENDS: At present, there are a minimum of 204 individuals in the wild and 124 pigeons in captivity. A captive flock was established at the University of Puerto Rico's Humacao Campus in 1987. The plain pigeon historically was widespread in the western foothills and valleys of Puerto Rico. Old records exist from Utuado, Lares, Anasco, Morovis (cave deposits), and Ponce (cave deposits). A pair was observed at Anasco in 1926, and then no further sightings were officially reported until 1963, when some of the birds were seen near the town of Cidra in east central Puerto Rico. Surveys conducted since 1973 indicate that the only existing population occurs near Cidra, and ranges into the surrounding municipalities, particularly Cayey. A few of the birds have also been recently reported at Gurabo and Utuado. The area surrounding Cidra and Cayey was densely wooded until 1910, when it was cleared for lumber and farmland. Practically all of the open land is now in some form of agriculture.

Extensive destruction of natural forest habitat and overhunting are postulated as causes for the decline. Today, habitat loss due to the rapid development of the Cidra area is the most serious threat to the species' existence. Disturbance is a concomitant problem. The majority of nest failures observed during investigations between December 1973 and September 1975 were the result of human-caused disturbances. Severe storms and hurricanes are considered a potential threat in that they could destroy essential habitat and kill the birds. Some pigeons are still being shot despite a Commonwealth Regulation (1967) closing Cidra to hunting. Establishment of new populations apparently has been limited by the bird's reluctance to colonize new areas.

PESTICIDE/SPECIES INTERFACE: The Puerto Rican plain pigeon is known to frequent agricultural fields and plantations. The bird may be exposed to pesticides applied to crops (e.g., various vegetables, coffee, bananas, sugarcane), livestock, and also for mosquito control. Rodenticides and avicides may also affect the pigeon when these toxic agents are used in agricultural areas frequented by the birds.

SAN CLEMENTE LOGGERHEAD SHRIKE (Lanius ludovicianus mearnsi) - E

SPECIES INFORMATION: The San clemente loggerhead shrike is a subspecies of the widespread loggerhead shrike. This subspecies is endemic to San Clemente Island, California. Most pairs are in the southwestern canyons on the island. habitat: contiguous stands of shrubs and trees required for nesting, forages over wider open areas. food habits: various insects, side-blotched lizards, small birds; reproductive habits: breeding season starts in January, clutches were completed through May. other pertinent info: see Scott, T.A. and M.L. Morrison. 1990. Natural History and Management of the San Clemente Loggerhead Shrike. Proc. of the West. Found. of Vert. Zool., 4(2):1-57. The California Channel Islands Species Recovery Plan was written in 1984.

SPECIES STATUS AND TRENDS: The current population: one of the most endangered vertebrate species in North America, thought to be down to about four pairs in 1990; the race is on the brink of extinction. The reasons for decline are loss of nesting habitat due to the introduction of feral goats. Also, predation by ravens, domestic cats, and island foxes resulting in a high fledgling mortality. The anticipated trends: will probably require removal of eggs and/or

young to facilitate double clutching. Captive breeding may be necessary to better insure long-term survival of this subspecies.

PESTICIDE/SPECIES INTERFACE: Pesticides sprayed within occupied habitat could threaten this species. The San Clemente loggerhead shrike species could be adversely impacted from the applications of avicides, and is also susceptible to secondary poisoning from eating contaminated prey items.

SAN CLEMENTE SAGE SPARROW (Amphispiza belli clementeae) - T

SPECIES INFORMATION: The San Clemente sage sparrow is a small gray bird with black streaks on the sides and a single black spot on the chest, dark cheeks, moustache streaks on sides of the throat, a white line over the eye, and white corners to the tail. This sparrow is a nonmigratory subspecies of the more widespread sage sparrow. This subspecies is endemic to San Clemente Island, California. The sparrow apparently occupies four discontinuous areas of a maritime desert scrub community that is primarily composed of cactus and *Lycium* sp. The subspecies is primarily a ground dweller and rarely occurs at an elevation of more than 30 to 40 meters above sea level. The sparrow feeds predominantly on the ground and uses the shrub canopy for feeding, protection, roosting, song perches, and nesting. Nests are generally constructed about four decimeters above the ground in dense foliage.

The San Clemente sage sparrow begins the reproductive cycle in late January or early February with singing, courtship, and territorial confrontation. Breeding behavior intensifies until actual nesting is initiated, which extends from approximately mid-March through at least mid-June. Male maintain moderate-sized (~0.65 hectare) territories. Nests are normally located in low dense shrubs 76-127 centimeters above the ground. Nests of this insular subspecies usually contains 1-3 eggs. While the incubation period is unknown, it is believed to be similar to the 13-14 days of mainland sage sparrows.

Postbreeding adults and juveniles congregate to form foraging flocks containing as little as 3-4 individuals, but as many as 20-25 individuals. San Clemente sage sparrows are primarily ground and stem gleaners that feed on fruits of cactus (*Opuntia* and *Bergerocactus*), *Atriplex semibaccata* seeds, grass inflorescences, insects, and possibly spiders.

SPECIES STATUS AND TRENDS: The San Clemente sage sparrow was apparently moreabundant formerly and has since experienced a population decline. Currently the population appears to be stable or slightly increasing at 250-400 individuals (possibly as high as 500 individuals). Suggested reasons for the decline in the population of this subspecies include: 1) a reduced food supply, 2) habitat destruction due to exotic, feral goats and pigs, or human activity, 3) inter-specific competition, 3) predation of nests and young by feral cats, island fox, American kestrels, red-tailed hawks, northern harriers, and barn owls, and 4) nest parasitism from brownheaded cowbirds which have been observed on the island as recently as 1980.

PESTICIDE/SPECIES INTERFACE: Pesticides sprayed within occupied habitat could threaten this species. The San Clemente sage sparrow could be adversely impacted from the applications of avicides, or vertebrate control agents that are applied in the form of granules, pellets, or treated baits.

WHOOPING CRANE (Grus americana) - E

SPECIES INFORMATION: The Whooping crane is the tallest North American bird approaching five feet tall when standing erect. There are two populations of these species including the wild population which nests in Wood Buffalo National Park, Canada, and migrates through the Plain States from northeast Montana, North Dakota, South Dakota, Nebraska, Kansas, and Oklahoma to its winter grounds in and adjacent to Aransas National Wildlife Refuge on the Texas coast. A second flock have been cross-fostered with sandhill cranes at Gray's Lake National Wildlife Refuge in Idaho and migrate with their foster parents to Bosque del Apache National Wildlife Refuge in central New Mexico. These whooping cranes feed and/or loaf in grain fields during migration through Idaho, Wyoming, Utah, Colorado, and New Mexico.

Whooping cranes are territorial birds that require undisturbed wetlands with open sand and gravel bars for nightly roosting. Critical habitat has been designated in seven national wildlife refuges including Monte Vista and Alamosa in Colorado, Gray's Lake in Idaho, Quivira in Kansas, Bosque del Apache in New Mexico, Salt Plains in Oklahoma, and Aransas, Texas. Cheyenne Bottoms State Waterfowl Management Area in Kansas also has been designated as critical habitat. In the winter, most foraging occurs in brackish bays, marshes, and salt flats lying between the mainland and barrier islands. Occasionally, whooping cranes will fly to upland sites when attracted by foods such as acorns, snails, crayfish, and insects, and then return to the marshes to roost. A portion of the whooping crane flock uses upland sites frequently in most years but agricultural croplands adjacent to Aransas National Wildlife Refuge are very rarely visited. Foods utilized during migration include frogs, fish, plant tubers, crayfish, insects, and waste grains in harvested fields.

Whooping cranes mate for life, and breeding starts at age 4 to 6. Nests are built of soft grass on a mound of reeds or sod. Two eggs are laid, incubation lasts 30 days, and the young are precocial.

SPECIES STATUS AND TRENDS: The wild whooping crane populations consist of 146 birds in the Aransas-Wood Buffalo flock and 13 birds in the Rocky Mountain flock. Nine whooping cranes have disappeared from Aransas National Wildlife Refuge during the winter of 1990-91. Man appears to have been directly or indirectly responsible for the decline of the species. Most of the losses of whooping cranes (about 66 percent) occurred during migration as a result of hunting, especially between the 1880's and 1920's. Since that time, most of the losses have been a result of habitat modification and human disturbance. For example, between 1956 and 1986, collisions with powerlines are known to have accounted for the death or serious injury of at least 15 whooping cranes. Most of the deaths of the Gray's Lake flock have been the result of collisions with powerlines or fences. The Gray's Lake is steadily declining from a maximum population of 30 birds in 1987 to the present population of 13 birds. Until the loss of the nine birds this winter, the Aransas-Wood Buffalo flock had been slowing increasing and we would except this to continue. Non-Federal actions that also may impact this species are unknown.

PESTICIDE/SPECIES INTERFACE: There are numerous pesticide uses that may occur in the vicinity of whooping crane habitat including, but not limited to, rangeland, pastures, mosquito control, noncrop land, rights-of-way, cotton, wheat, sorghum, soybeans, oats, barley, rye, and alfalfa. These pesticide uses could impact the whooping crane in several ways. Whooping cranes

may ingest insects or other food items contaminated with pesticides and pesticide runoff and direct application through spray drift or by accident could reduce the food population of the crane. Cranes could be expected to forage in fields increasing their risk of exposure. Drinking water sources also could be expected to be contaminated either through direct application, runoff, or drift. Additional impacts could be expected with cranes preening themselves and receiving oral doses of a pesticide.

YELLOW-SHOULDERED BLACKBIRD (Agelaius xanthomus) - E

SPECIES INFORMATION: In size the Yellow-shouldered blackbird is slightly smaller than the red-winged blackbird. Adults and juveniles of both sexes have all black plumage with yellow epaulettes. Juveniles can be distinguished from adults by black speckling over the edges of the epaulettes. Adult males are significantly larger, about 17 percent by weight, than the females.

The yellow-shouldered blackbird is endemic to Puerto Rico and nearby Mona Island. While once widespread throughout Puerto Rico, the species is now limited to three areas: the coastal southwestern area; a small coastal eastern area; and Mona Island. Estimated populations in 1976 were 200 in eastern Puerto Rico; 2,000 in southwestern Puerto Rico; and 200 on Mona Island. A 1976 estimate that the population in the Southwest was declining at a rate of approximately 20 percent per year. More recent estimates (1989 and 1990) indicate that there are approximately 350 individuals in the southwest, less than 25 in eastern Puerto Rico, and from 400 to 500 in Mona Island. There is some evidence that the yellow-shouldered blackbird once occurred throughout Puerto Rico, although more commonly in the coastal zone. Studies of southwestern Puerto Rico, the population center for the species, indicated that during the nesting season (May to September) most of the birds stay either in the mangrove zone or the arid coastal fringe. Nesting occurs in mangroves along the coast and on small off-shore islands. Other nesting habitat includes large deciduous trees, primarily oxhorn bucida (Bucida buceras) in dry lowland pastures; coconut trees (Cocos nucifera); royal palms (Roystonea borinquena); and on Mona, the sheer coastal cliffs which surround the island.

Although this species is omniverous, it can be basically characterized as an arboreal insectivore. During the nesting season the young's diet is about 90 percent arthropod material. At bird feeders and around domestic animals, this blackbird has been observed to take cattle ration, dog food, monkey chow, nectar, fruit, cooked rice, and granulated sugar. The nesting season in southwestern Puerto Rico is April to October. Open, cup-shaped nests typical of the genus are usually constructed in trees. Blackbirds at the eastern end of Puerto Rico also use cavities or hollows in dead mangroves, and those on Mona Island place their nests on the ledges or in crevices of the sheer coastal cliffs. Nesting pairs often aggregate, and in several cases, nests have been located in the same tree as close together as 3.5 meters. All incubation and breeding is handled by the female, with the pair sharing equally with feeding the young. Usually only one nesting is attempted per year. The females are known to reach breeding age during their first year, but there are no data available for males.

SPECIES STATUS AND TRENDS: One of the principal reasons for the decline is attributed to parasitism by the shiny cowbird (*Molothrus bonariensis*), which lays its eggs in the blackbird's nest and sometimes punctures the host's eggs. The shiny cowbird is an exotic species that managed to reach Puerto Rico in about 1955 from other antillean islands to the southeast. A 1975 survey of mainland blackbird nests showed 73.7 percent were parasitized by the cowbird. Comparisons

between parasitized and unparasitized nests revealed that only 25 percent of the former produced young, whereas 50 percent of the unparasitized nests were productive. Three introduced pest species, the black rat (Rattus rattus); Norway rat (Rattus norvegicus); and the mongoose (Herpestes javanicus) have contributed to the decline by preying on the blackbird's nest. Habitat modification and destruction played an important role in the decline, eliminating both foraging and nesting areas. Fowl pox infects about 19 percent of the adult population and may also be contributing to the decrease. Today, an important factor is the threatened loss of habitat, especially the coastal and offshore island mangroves where about 86 percent of the nesting now occurs.

PESTICIDE/SPECIES INTERFACE: The yellow-shouldered blackbird would be exposed to agricultural pesticides used on sugarcane, pineapple, coffee, various vegetables, citrus and livestock. Rodenticides, avicides, and mosquito control applications may also affect the species when used in agricultural areas frequented by the birds.

REPTILES

BLUNT-NOSED LEOPARD LIZARD (Gambelia silus)

with of

SPECIES INFORMATION: The Blunt-nosed leopard lizard is a large, robust, iguanid lizard that may exceed 15 inches in length. The species often conspicuously basks along the edges of secondary dirt roads, open alkaline soil areas, or embankments. The blunt-nosed leopard lizard typically is active when air temperatures are between 77° and 95° F, generally between the months of April through September, although hatchling activity can extend into October. Both adults and hatchlings remain underground in rodent burrows during the winter months. Their diet includes hymenoptera, orthopterans, cicadas, and larval lepidopterans.

SPECIES STATUS AND TRENDS: The blunt-nosed leopard lizard was historically distributed throughout the San Joaquin Valley and adjacent interior foothills and plains, extending from central Stanislaus County south to extreme northeastern Santa Barbara County. Preferred habitat consists of open grassland, saltbush shrubland, and alkaline sink communities. The area occupied by this species has been significantly reduced and fragmented by agricultural, urban, and other man-induced actions.

PESTICIDE/SPECIES INTERFACE: This species could be adversely impacted from burrow fumigants that are targeted for rodents and applied in the same burrows as those occupied by the lizards.

COACHELLA VALLEY FRINGE-TOED LIZARD (Uma inornata) - T

SPECIES INFORMATION: The Coachella Valley fringe-toed lizard is a medium-sized lizard approximately 150-240 millimeters in total length. The species is restricted to remaining windblown sand deposits in the Coachella Valley from near Cabazon to near Thermal. In 1979, perhaps only 99 square miles of habitat remained. This species habitat is sand dunes with scattered creosote, mesquite, and desert willows and it feeds on plants and insects. It is known to use rodent burrows or construct its own burrows.

SPECIES STATUS AND TRENDS: The exact number of the current population is not known. The reasons for decline includes urbanization leading to habitat loss and fragmentation, agricultural development, windbreak construction (holds back sand), flood control, and golf course development. Anticipated trends include continued habitat loss. Non-federal impacts to the species include habitat loss.

PESTICIDE/SPECIES INTERFACE: This species could be adversely impacted from burrow fumigants that are targeted for rodents and applied in the same burrows as those occupied by the lizards. The lizard is also susceptible to poisoning or sublethal effects from eating vegetation contaminated with insecticides or herbicides applied within occupied habitat.

DESERT TORTOISE (Gopherus agassizii) - T

SPECIES INFORMATION: The Desert tortoise is a large terrestrial turtle which has ranged historically over most of the southern California deserts, into Arizona and the southern part of Utah. By 1980 it was eliminated from the Coachella and Imperial Valleys of California. In its desert habitat it feeds on cactus, annual forbs, grasses, and flowers. Ten to 20 years is required to reach breeding age, rate of reproduction is low, young are soft-shelled and heavily preyed upon, especially by ravens. The species forages from March to June, estivates during the summer in burrows, may emerge in fall, and hibernates from October to March

SPECIES STATUS AND TRENDS: The exact number of the species is unknown. Reasons for the species' continued decline includes urbanization, off-road vehicle use, mining, energy development, upper respiratory disease (URDS) that has resulted in an estimated 50% of present mortality, loss as pets, vandalism, and the population explosion of ravens resulting in increased predation on the tortoise.

PESTICIDE/SPECIES INTERFACE: This species could be adversely impacted from burrow fumigants that are targeted for rodents and applied in the same burrows as those occupied by tortoises. Tortoises are also susceptible to poisoning or sublethal effects from eating vegetation contaminated with insecticides or herbicides applied within occupied habitat. They are also at some risk from dermal exposure to certain insecticides.

EASTERN INDIGO SNAKE (Drymarchon corais couperi) - T

SPECIES INFORMATION: The Eastern indigo snake is a large, docile, non-poisonous snake growing to a maximum length of about 8 feet. The color in both young and adults is shiny bluishblack, including the belly, with some red or cream coloring about the chin and sides of the head. Indigo snakes probably reach sexual maturity at 3 to 4 years of age. Based on observations of captive indigos at Auburn University, mating begins in November, peaks in December, and continues into March. Clutches averaging eight to nine eggs laid in late spring hatch approximately 3 months later. The snakes remain active to some degree throughout the winter, often emerging from their dens whenever air temperatures exceed 50 degrees Fahrenheit.

This species is currently known to occur throughout Florida and in the coastal plain of Georgia. Historically, the range also included southern Alabama, southern Mississippi, and the extreme southeastern portion of South Carolina. The indigo snake seems to be strongly associated with high, dry, well-drained sandy soils, closely paralleling the sandhill habitat preferred by the gopher tortoise. During warmer months, indigos also frequent streams and swamps, and individuals are occasionally found in flat woods. Gopher tortoise burrows and other subterranean cavities are commonly used as dens and for egg laying. The home range of indigos varies considerably according to season. Based on a study conducted in southwest Georgia, an average seasonal range of 4.8 hectares during the winter (December through April), 42.9 hectares during late spring or early summer (May through July), and 97.4 hectares during late summer and fall (August through November). The most extensive monthly movements occurred during August. Of a total of 108 den sites located, 77 percent were in gopher tortoise burrows, 18 percent were in or under decayed stumps and logs, and 5 percent were under plant debris. The study area included windrows of debris piled up in the 1960's during site preparation for a slash pine

plantation. The snakes showed some tendency to prowl and locate their dens near these windrows. This same study also indicated that during May-July that at least 10 percent, and in August-November at least 5 percent, of all indigo snake activity occurred within 150 feet of agricultural fields. Food items include snakes, frogs, salamanders, toads, small mammals, birds, and occasionally young turtles. The indigo snake subdues its prey (including venomous snakes) through the use of its powerful jaws, swallowing the prey usually still alive.

SPECIES STATUS AND TRENDS: The eastern indigo snake population is declining. The decline is attributed primarily to a loss of habitat due to such land use changes as farming, construction, forestry, pasture, etc., and to over-collecting for the pet trade. The snake's large size and docile nature have made it much sought after as a pet. The effect of Rattlesnake Roundups on the indigo snake are speculative. Both indigos and rattlers utilize the burrows of gopher tortoises at certain times. Rattlesnake hunters often pour gasoline down these burrows to drive out the snakes. While some indigos may be killed by this practice, the actual degree of impact on the population is unknown. Recovery tasks currently being implemented include habitat management through controlled burning, testing experimental miniature radio transmitters for tracking of juvenile indigo snakes, maintenance of a captive breeding colony at Auburn University, recapture of formerly released snakes to confirm survival in the wild, presentation of education lectures and field trips, and efforts to obtain landowner cooperation in indigo snake conservation efforts.

PESTICIDE/SPECIES INTERFACE: The eastern indigo snake would primarily be exposed to pesticide uses on crops such as cotton, corn, soybeans, small grains, alfalfa, hay, pasture, forestry/silviculture. Direct exposure to treated areas and secondary exposure by ingestion of contaminated prey can occur. Secondary exposure to rodenticides may also occur, as the indigo snake is found in or near agricultural activity, fields or structures that would typically be treated for rodent control.

GOPHER TORTOISE (Gopherus polyphemus) - T

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SPECIES INFORMATION: The Gopher tortoise is a large, 5.9 to 14.6 inches long, dark-brown to grayish-black terrestrial turtle with elephantine hind feet, shovel-like forefeet, and a gular projection beneath the head on the yellowish, hingeless plastron or undershell. The sex of individual turtles can usually be determined by shell dimensions. A male turtle has a greater degree of lower shell concavity, and a longer gular projection.

This turtle feeds primarily on grasses, grass-like plants, and legumes. Its diet may also include mushrooms, fleshy fruits, and possibly some animal matter. Sometime between late April and mid-July, the female digs a nest in sandy soil, lays a clutch of 4 to 12 eggs, and after refilling the hole leaves the eggs for incubation by the sun's heat. Hatching occurs in August and September. The juvenile tortoises suffer a heavy natural predation loss of almost 97 percent through the first 2 years of life. Those that survive grow to sexual maturity slowly over a period of 13 to 21 years, depending on the portion of the range and the sex of the turtles. Females usually reach reproductive maturity at 19 to 21 years old. The low reproductive rate is accentuated by the fact that there is some evidence to indicate that not all females nest every year. The juveniles that are born and survive may live an average of 40 to 60 years, sometimes 80 to 100.

The gopher tortoise most often lives on well-drained sandy soils in transitional (forest and grassy) areas. It is commonly associated with a pine overstory and an open understory with a grass and forb groundcover and sunny areas for nesting. Most of the gopher tortoise's life is spent in and around the burrow. The gopher tortoise establishes a well-defined home range which increases in size as the tortoise grows older and larger. For refuge the tortoises dig burrows which average around 5 to 10 feet in depth and may be 10 to 20 feet (or more) in length. The burrow becomes a more or less permanent home although there may be alternate burrows in the area. Several other species may also share gopher tortoise burrows. Some commonly known burrow sssociates include the eastern indigo snake, the eastern diamondback rattlesnake, and the gopher frog. The species occurs in sandy coastal plain areas from extreme southern South Carolina to the southeastern corner of Louisiana, and throughout most of Florida.

SPECIES STATUS AND TRENDS: Less than 20 percent of the historically available habitat remains for the western population of the gopher tortoise. The population segment from the Tombigbee and Mobile Rivers in Alabama, westward, is classified as threatened, and for convenience is termed the western population. This entire western population is within the the original range of the longleaf pine. Using statistics of the U.S. Department of Agriculture, the Fish and Wildlife Service estimates that present ownership distribution of gopher tortoise habitat is approximately two-tenths in National Forest, one-tenth in other public ownership, three-tenths in forest industry, and four-tenths in other private ownership. No estimate is available for the gopher tortoise's total population size. Biologists have estimated a population density of 0.713 tortoises per hectare in Mississippi and 0.97 tortoises per hectare in Alabama in 1975, whereas other estimates indicate a density of 0.107 and 0.32 per hectare in those states, respectively, in the early 1980's. Biologists were also able to document only 11 active burrows in Louisiana in 1981, and only one remaining in 1984. There is an indicated decline in population densities ranging from 67 percent in Alabama to 91 percent in Louisiana.

Conversion of gopher tortoise habitat to urban areas, croplands, and pasturelands along with adverse forest management practices has reduced the western portion of the historic range. Taking gopher tortoises for sale or use as food or pets has also had a serious effect on some populations. The seriousness of the loss of adult tortoises is magnified by the length of time required for tortoises to reach maturity and their low reproductive rate. Current estimates of human predation and road mortality alone are at levels that could offset any annual addition to the population. A number of other species also prey upon gopher tortoises including the raccoon, who is the primary egg and hatchling predator; gray foxes; striped skunks; armadillos; dogs; snakes; and raptors. Imported fire ants also have been known to prey on hatchlings. Reported clutch and hatchling losses often approach 90 percent.

PESTICIDE/SPECIES INTERFACE: The gopher tortoise would primarily be exposed to pesticides that are applied to various crops including cotton, soybeans, alfalfa, hay, pasture, as well-in as applications for forestry/silviculture practices. The tortoise may be at risk from direct contact slori with treated areas and ingestion of contaminated vegetation.

ISLAND NIGHT LIZARD (Xantusia riversiana) - T

SPECIES INFORMATION: The Island night lizard is a 5 to 6 inch broad-headed, brownish. sometimes striped lizard. The species is endemic to Santa Barbara, San Clemente, and San Nicolas Islands of California. It occurs under shrub cover and feeds on small insects, spiders,

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etc. The bulk of their diet consists of lizards (Anolis cristatellus), but they also likely feed on small birds and mammals.

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SPECIES STATUS AND TRENDS: This species' present status is unknown. The decline of the species throughout a large portion of its historical range has been attributed to the effects of predation by the introduced Indian mongoose and introduced rats. Habitat destruction/disturbance due to increasing human, dog, and housecat populations are also likely having an adverse effect on the surviving boa populations.

PESTICIDE/SPECIES INTERFACE: Pesticide use for mosquito control is likely to occur within or adjacent Virgin Island tree boa habitat and has the potential to adversely affect this species. Ingestion of contaminated prey items and water; or absorption of the pesticides through their skin following direct contact with the spray or contact with contaminated surfaces are all likely means of exposure. Rodenticides may also pose a risk if the snake were to ingest a poisoned rodent.

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INSECTS

EL SEGUNDO BLUE BUTTERFLY (Euphilotes battoides allyni) Edgin in 1917

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SPECIES INFORMATION: The El Segundo blue butterfly ranges in two small areas in Los Angeles County -- two acres of a Chevron oil refinery, and 300 acres at the western end of the Los Angeles International Airport. The species feeds and lays eggs on a sand dune species of buckwheat.

SPECIES STATUS AND TRENDS: The exact number of this population is not known. The reasons for decline include loss of dune habitat in western Los Angeles County. A golf course is proposed for large part of airport dunes. The Chevron site is managed to protect this species. Non-federal impacts of the species include a golf course and other proposed developments.

PESTICIDE/SPECIES INTERFACE: This butterfly could be adversely impacted from the dispersion of burrow fumigants applied in nearby burrows as vertebrate control agents to soil occupied by larvae or from insecticides applied within the species' extremely restricted habitat.